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# The Government of Thailand
# The Northeast Development Plan
# 1962 - 1966

**The Committee on Development of the Northeast**

The Planning Office
The National Economic Development Board
Office of the Prime Minister
Bangkok

# The Committee on Development of the Northeast

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# Contents of the Northeast Development Plan

## 1962 - 1966

Page

**The Committee on Development of the Northeast**

**CHAPTER I Policies on Development of the Northeast** 1

**CHAPTER II Area Development in the Northeast** 3

**CHAPETR III Targets of the Plan** 6

***Targets in the Private Sector*** 6

**Large - Scale Industries** 7
**Home Industries** 8
**Agriculture** 9

***Targets in the Public Sector*** 18

**Agriculture and Cooperatives** 18
**Industry and Power** 22
**Transport and Communications** 24
**Community Development, Land Use, and Public Utilities** 26
**Public Health** 28
**Education** 29

**CHAPTER IV Development Expenditures and Sources of Finance** 30

Development Outlays Provided Under the Nutional Plan 31
Special Funds to Accelerate Development 32
Counterpart Funds 32
Grants Requested 33
Total Development Outlays 35

**CHAPTER V The Northeast Development Projects** 36

***Section I Project Under the National Economic Development Plan*** 38

Agriculture and Cooperatives 38
Industry and Power 52
Transport and Communication 55
Community Development, Land Use, and Public Utilities 58
Public Health 62
Education 66

***Section II Projects to Be Financed by Special Funds*** 76

Agriculture and Cooperatives 76
Community Development, Land Use, and Public Utilities 80
Public Health 81
Education 82

*Section III Projects Requiring Foreign Grants and Loans* 83
Project Requiring Foreign Grants 83
Project Requiring External Loans 99

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**MAPS OF THE NORTHEAST** **Page**

POPULATION DENSITY BY AMPHUR IN THE NORTHEAST 2–3
KHONKAEN MUNICIPALITY'S AREA 2–3
WATER RESOURCES DEVELOPMENT PROJECT 38–39
ROCK SALT 52–53
NAM PONG PROJECT 54–55
DEVELOPMENT OF WATER RESOURCES IN THE LOWER MAKONG BASIN 54–55
NORTHEAST HIGHWAYS 56–57
POWER STATIONS IN THE NORTHEAST BY THE SIZE OF PEAK LOAD 60–61
NORTHEAST HIGHWAYS AND FEEDER ROADS 60–61

*Section III Projects Requiring Foreign Grants and Loans*

Project Requiring Foreign Grants 83
Project Requiring External Loans 99

# CHAPTER I

## Policies on Development of the Northeast

His Majesty's Government with Field Marshal Srisdi Dhanarajata as Prime Minister considers the Northeastern region of Thailand with the area of 170,222 square kilometers and the population of 8,794,861 in fifteen provinces highly significant economically, politically, and militarily. The Committee on Development of the Northeast was set up to draft the Five Year Development Plan for the Northeast for the period 1962 to 1966. The Plan was presented to and approved by the Cabinet in October, 1961.

The aim of the Northeast Development Plan is to raise the standard of living of the Northeastern people to the level comparable with that of the other regions bringing about greater welfare and happiness to the inhabitants of this region, and to lay down economic and social infrastructures for future economic stability and progress. The Committee holds above all the fact that the Northeastern part is an integral and inseparable part of the Kingdom of Thailand and that the Thai nationals living in the Northeastern region are Thai citizens.

***According to this overall policy the Government will undertake the following economic and social development measures:***

1. Provision of water for consumption and home use, and for agriculture and industry through the construction of impounding dams and irrigation tanks to irrigate farm lands and to create fishing grounds; flood control; and improvement of natural water resources.

2. Construction and improvement of means of transport and communications—highways, railways, and rural roads. Existing routes will be

upgraded to and new routes will be constructed as high standard, all-weather roads with asphalted surface. As a result, the livelihood of the people will be improved and the costs of living will fall.

3. Government assistance through agricultural services, irrigation, and market expansion alongside development in the private sector. Agricultural improvement units will be set up to demonstrate to the rural people proper use of soil and water, so as to bring about greater quantity and better quality of agricultural commodities, particularly those with strong export demand. The land tenure system will be based upon private land ownership. Land fragmentation is, however, to be avoided.

4. Adequate power at reasonable price. The Government deems it important to survey potential hydro and thermal power sources including distribution systems throughout the region. Power projects will be undertaken in accordance with the recommendations of recognized authorities. Industrial and agricultural uses of energy, the latter for rural electrification and pump irrigation, will be taken into account.

5. Industrial and commercial development to be left to private enterprise. The Government stands ready to assist and facilitate potential investments. Large-scale and home industries should depend on local raw materials and labor. Skilled labor training will be encouraged.

6. Promotion of community development, public health, and education to the level not below the other regions. The Government believes that the goal of community development is to reach the people and to show them the way to improve their own conditions under the tenet of self-help and collective responsibilities. This will be promoted in conjunction with the urbanization scheme. In the field of public health major contagious diseases are to be wiped out. Regional hospitals will be constructed. Educational development will follow the National Education Plan. In addition, the Northeast Institute for Agriculture and Mechanical Science is to be set up and later expanded into a regional university. With regard to educational development the emphasis will be on vocational education and training.

# CHAPTER II

## Area Development in the Northeast

As a measure to promote development in the Northeast, the Government plans to establish a few provincial centers in the region. In each of these centers, there will be adequate provision of public utilities and other necessary facilities as well as concentration of government services. Because of their interrelatedness, the availability of a combination of such basic services and facilities in one particular area is likely to result in external economics which are conducive to economic growth. Since industrial development is a development goal other than greater agricultural productivity and output, private industrial investment will also be encouraged thus facilitating the growth of suitable industries. As these centers progress economically, their achievement in various fields of activities will, no doubt, have impact on the adjoining areas, thus effecting acceleration of rural development.

***To carry out the above policy the Government has chosen Khonkaen as the first area development center for the following reasons :***

1. Khonkaen has a large enough population for various development activities.

2. It is the most centrally located province as regards transport and communications.

3. The Nam Pong Project, when completed, will generate electricity to Khonkaen and nearby provinces.

4. Khonkaen has great potential for agricultural development. These agricultural commodities will provide raw materials for various industries.

5. Its outlying regions contain deposits of rock salt in abundance suitable for chemical industries.

**Major activities to be undertaken at Khonkaen:**

### *Hydroelectric Power*

Engineering and economic feasibilities of the Nam Pong Project have been ascertained. According to the plans, an impounding dam will be constructed with the installed capacity of 25,000 kilowatts. The Dong Larn Forest will be permanently reserved to protect the watershed area.

### *Agriculture and Irrigation*

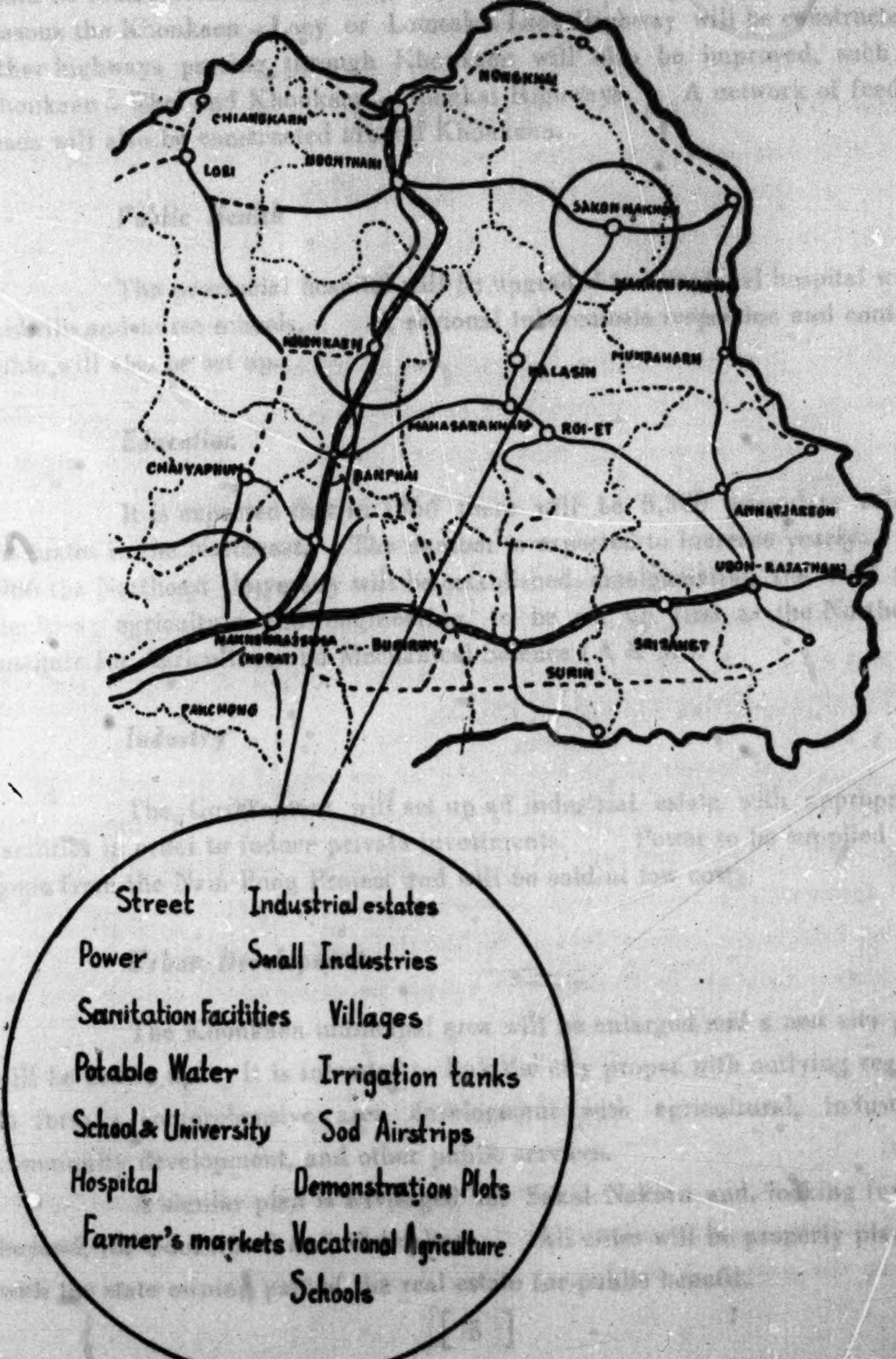
The plains to be irrigated by the Nam Pong Dam total about 100,000 acres. With the supply of irrigation water, field crops and livestock production around Khonkaen can be expected to increase substantially. The agricultural rehabilitation unit to be stationed here will be responsible for promoting the improvement on production of rice, kenaf, cotton, maize, and castor beans. It is also planned to set up a combined experimental station within the Nam Pong's irrigation area. Public grazing lands will also be set up with proper pasture and forages. The Tha Pra Livestock Station will be enlarged with emphasis on research in beef cattle husbandry.

The land from Loey to Khonkaen has great potential for cotton production. Better varieties will be introduced. When the volume of production is sufficient enough to warrant it, textile factories will be encouraged to be located at Khonkaen. Besides cotton, maize, kenaf, and castor beans are also suitable as industrial raw materials.

### *Transport and Communications*

Preliminary surveys indicate that there is a fair quantity of iron and manganese ores in the upper western part of the Northeast. If cheap fuel

# AGRIMETRO CENTER


CHIANGKARN
LOEI
UDONTHANI
NONGKHAI
SAKON NAKHON
NAKHON PHANOM
KHONKAEN
KALASIN
MUNDAHARN
MAHASARAKHAM
ROI-ET
CHAIYAPHUM
BANPHAI
AMNATJAREON
UBON-RAJATHANI
NAKHONRAJSIMA
(KORAT)
BURIRUM
SRISAKET
SURIN
PAKCHONG
Street
Industrial estates
Power
Small Industries
Sanitation Facitities
Villages
Potable Water
Irrigation tanks
School & University
Sod Airstrips
Hospital
Demonstration Plots
Farmer's markets
Vacational Agriculture
Schools

could be found, steel industry may be justified at Loey. For this and other reasons the Khonkaen – Loey or Lomsak – Loey Highway will be constructed. Other highways passing through Khonkaen will also be improved, such as Khonkaen – Ubol and Khonkaen – Nongkai Highways. A network of feeder roads will also be constructed around Khonkaen.

### *Public Health*

The provincial hospital will be upgraded to a regional hospital with midwife and nurse schools. A regional tuberculosis inspection and control clinic will also be set up.

### *Education*

It is expected that in 1966 there will be 3,300 secondary school graduates in the Northeast. The number is expected to increase yearly. In 1966 the Northeast University will be established amalgamating the first two faculties; agriculture and engineering, to be set up first as the Northeast Institute for Agriculture and Mechanical Science (A & M).

### *Industry*

The Government will set up an industrial estate with appropriate facilities in order to induce private investments. Power to be supplied will come from the Nam Pong Project and will be sold at low cost.

### *Urban Development*

The Khonkaen municipal area will be enlarged and a new city plan will be drawn up. It is intended to link the city proper with outlying regions to form a comprehensive area development with agricultural, industrial, community development, and other public services.

A similar plan is envisaged for Sakol Nakorn and, looking further beyond, for Udornthawi and Mukdaharn. All cities will be properly planned with the state owning part of the real estate for public benefit.

# CHAPTER III

## Targets of the Plan

The targets of the Northeast Development Plan are for both the public and private sectors; they are largely in the field of agriculture, including production of rice and field crops, fisheries, livestock, and forest products. The targets estimated are based upon current statistics, past trends, foreign market demand, and other economic reasons. Production targets of commodities to be specially promoted are based upon the capacity, particularly technical manpower, of the relevant government agencies. Agricultural production depends, of course, to a large extent upon climatic conditions and vicissitudes in world markets, and definite annual targets cannot accurately be laid down. The figures listed are estimates arrived at through study of available information and expected trends.

The targets of the Northeast Plan are related to the overall national targets. As far as the increase in the gross national product coming from production of goods and services in the Northeast is concerned, it is expected that agricultural production will increase as planned, contributing some 2,500 billion baht to the national income for the five years. Industrial and service production data are inadequate and cannot be calculated at present and will be compiled in the near future.

### Targets in the Private Sector

Targets in the private sector are classified as industrial and agricultural targets. Agricultural targets are production targets to be aimed at during the period of the Plan. They denote production increase on farm brought about by various services and facilities, including better transportation, and expansion in foreign and home demands.

As far as the industrial targets are concerned, production data are not available even for small-scale industries now in existence. Large-scale enterprises expected from private investments will depend upon raw material sources, size of market, and other determinants. No attempt will be made to predict their scale of operation at this stage. Only the types of industries deemed feasible for the Northeast will be listed.

### Private Sector : Large - Scale Industries

| Type of Industry | Possible Raw Materials |
|---|---|
| 1. Chemicals | Rock salt and certain minerals |
| 2. Fertilizers | Lignite |
| 3. Paper | Pine and soft woods |
| 4. Gunny bags | Kenaf |
| 5. Textile and weaving | Cotton |
| 6. Vegetable oils | Oilseeds such as beans, castor beans and sesame |
| 7. Mining | Minerals such as iron, copper, gypsum, and manganese |
| 8. Sugar refinery | Sugar cane |
| 9. Construction | |
| 10. Construction materials | Woodchips, bagasse, etc. |
| 11. Ore smelting | Lead, manganese, etc. |
| 12. Rope and rugs | Kenaf, hemps |
| 13. Vanishing materials | Pine resin |
| 14. Sticklac and shellac | Lac |
| 15. Flour mills | Rice, maize, etc. |
| 16. Animal feeds | Maize, rice brans, cassava, etc. |
| 17. Plastic | Castor beans |

18. Hotels
19. Consumer goods such as shoes, clothing, and household goods.
20. Large-scale rice mills, sawmills, cold storages, abatoirs, etc.

These large-scale industries cannot be expected to spring up suddenly. There are several factors to consider, especially marketing and sale problems. However, the Northeast offers certain advantages for industrial production such as abundant labor at reasonable wages, inexpensive land, and plentiful quantities of certain raw materials. The basic policy on development of the Northeast is definite as regards the laying down of infrastructures such as power, highways, and public utilities. Once this is achieved, the tempo of industrial development in this region should be greatly accelerated.

In addition to large-scale industries home or cottage industry is to be promoted as a priority measure. Some of the small-scale industries may have a chance to grow into medium sized industries. The income of the people will be augmented, especially in otherwise idle season. Villagers will be trained in up-to-date techniques with prototype products and designs as examples to utilize more efficiently already available local products. Simple machinery will be introduced to increase productivity. Primary emphasis will be on marketable handicrafts now generally produced on a limited scale normally with low quality.

### Private Sector : Home Industries

| Type of Industry | Possible Raw Materials |
|---|---|
| 1. Silk weaving | Silk |
| 2. Cloth weaving | Cotton and silk |
| 3. Ropes and mats | Kenaf, ramie, and hemps |

| | |
|---|---|
| 4. Pottery | Clay |
| 5. Cementwares | |
| 6. Metalworks | |
| 7. Weaving | Bamboo, kenaf, etc. |
| 8. Tanning | Hides |
| 9. Sticklac | Lac |
| 10. Salt | Ground salt |
| 11. Vegetable oils and forest products | |
| 12. Other handicrafts and skilled commodities | |

A by-product of home industry is to train the skills of the people in industrial technology and methods. They will also be more amenable to the process of industrialization. This will serve to strengthen the foundation for future industrial growth.

## Private Sector : Agriculture

Agricultural targets are production targets to be expected in 1966. Major commodities are shown in the following tables.

### Private Sector : Agricultural Targets

| Rice, field crops, livestock, aquatic animals, and lumber | | Northeast only | | | |
|---|---|---|---|---|---|
| **1. Rice and field crops (1,000 tons)** | | 1956 | 1962 | 1966 | Production increase 1962–1966 |
| *1) Rice* 1/ | Whole country | 7,462.10 | | | |
| | Northeast | 2,077.10 | 2,260.00 | 2,380.00 | 120.00 |
| | Ratio (%) | 27.83 | | | |

| Rice, field crops, livestock, aquatic animals, and lumber | | Northeast only | | | |
|---|---|---|---|---|---|
| **1. Rice and field crops (1,000 tons)** | | 1959 | 1962 | 1966 | Production increase 1962–1966 |
| ***2) Maize*** | Whole country | 317.20 | | | |
| | Northeast | 112.30 | 320.00 | 400.00 | 80.00 |
| | Ratio (%) | 35.40 | | | |
| ***3) Kenaf*** | Whole country | 50.00 | | | |
| | Northeast | 49.20 | 150.00 | 200.00 | 50.00 |
| | Ratio (%) | 98.40 | | | |
| ***4) Beans*** 2/ | Whole country | 192.10 | | | |
| | Northeast | 41.70 | 46.70 | 55.04 | 8.34 |
| | Ratio (%) | 21.70 | | | |
| ***5) Cassava*** | Whole country | 1,083.20 | | | |
| | Northeast | 39.90 | 46.28 | 56.26 | 9.98 |
| | Ratio (%) | 3.68 | | | |
| ***6) Sesame*** | Whole country | 16.30 | | | |
| | Northeast | 5.70 | 7.59 | 11.12 | 9.98 |
| | Ratio (%) | 34.96 | | | |
| ***7) Castor beans*** | Whole country | 34.00 | | | |
| | Northeast | 10.10 | 13.44 | 19.69 | 6.25 |
| | Ratio (%) | 29.70 | | | |
| ***8) Sugar cane*** 3/ | Whole country | 4,988.00 | | | |
| | Northeast | 1,213.40 | 1,326.25 | 1,492.48 | 166.23 |
| | Ratio (%) | 24.32 | | | |
| ***9) Cotton*** | Whole country | 37.40 | | | |
| | Northeast | 20.80 | 27.68 | 40.56 | 12.88 |
| | Ratio (%) | 55.61 | | | |

| Rice, field crops, livestock, aquatic animals, and lumber | | Northeast only | | | |
|---|---|---|---|---|---|
| **1. Rice and field crops (1,000 tons)** | | 1959 | 1962 | 1966 | Production increase 1962 – 1966 |
| ***10) Tobacco*** | Whole country | 67.10 | | | |
| | Northeast | 22.30 | 25.87 | 31.44 | 5.57 |
| | Ratio (%) | 33.23 | | | |
| ***11) Kapok*** | Whole country | 382.30 | | | |
| | Northeast | 99.00 | 131.77 | 193.31 | 61.54 |
| | Ratio (%) | 25.89 | | | |
| ***Total*** | Whole country | 14,629.70 | | | |
| | Northeast | 3,691.50 | 4,355.58 | 4,879.90 | 524.32 |
| | Ratio (%) | 25.23 | | | |
| | Index | 100 | 117.97 | 132.16 | |
| **2. Livestock (thousands)** | | | | | |
| ***1) Water buffa-loes*** | Whole country | 6,422.30 | | | |
| | Northeast | 3,001.00 | 3,500.00 | 4,300.00 | 800.00 |
| | Ratio (%) | 46.72 | | | |
| ***2) Cattle*** | Whole country | 5,114.60 | | | |
| | Northeast | 2,378.00 | 2,700.00 | 3,300.00 | 600.00 |
| | Ratio (%) | 46.49 | | | |
| ***3) Swine*** | Whole country | 4,205.60 | | | |
| | Northeast | 1,155.00 | 1,700.00 | 2,500.00 | 800.00 |
| | Ratio (%) | 27.40 | | | |
| ***Total*** | Whole country | 15,742.50 | | | |
| | Northeast | 6,534.00 | 7,900.00 | 10,100.00 | 2,200.00 |
| | Ratio (%) | 41.50 | | | |
| | Index | 100 | 120.90 | 154.57 | |

| Rice, field crops, livestock, aquatic animals, and lumber | | Northeast only | | | |
|---|---|---|---|---|---|
| **3. Inland aquatic animals (1,000 tons)** | | 1959 | 1962 | 1966 | Production increase 1962-1966 |
| | Whole country | **57.00** | | | |
| ***Total*** | Northeast | **25.50** | **28.0** | **35.0** | **7.0** |
| | Ratio (%) | **39.47** | | | |
| | Index | **100** | **109.80** | **137.25** | |
| **4. Lumber ( cubicmeters )** | | | | | |
| ***1) Yang*** | Northeast | 46,404 | – | – | – |
| ***2) Tengrung*** | Northeast | 49,894 | – | – | – |
| ***3) Takien*** | Northeast | 46,826 | – | – | – |
| ***4) Other*** | Northeast | 124,350 | – | – | – |
| | Whole country | **1,111,690** | | | |
| ***Total*** | Northeast | **307,474** | **320,000** | **350,000** | **30,000** |
| | Ratio (%) | **27.65** | | | |
| | Index | **100** | **104.07** | **113.83** | |

**Note :**

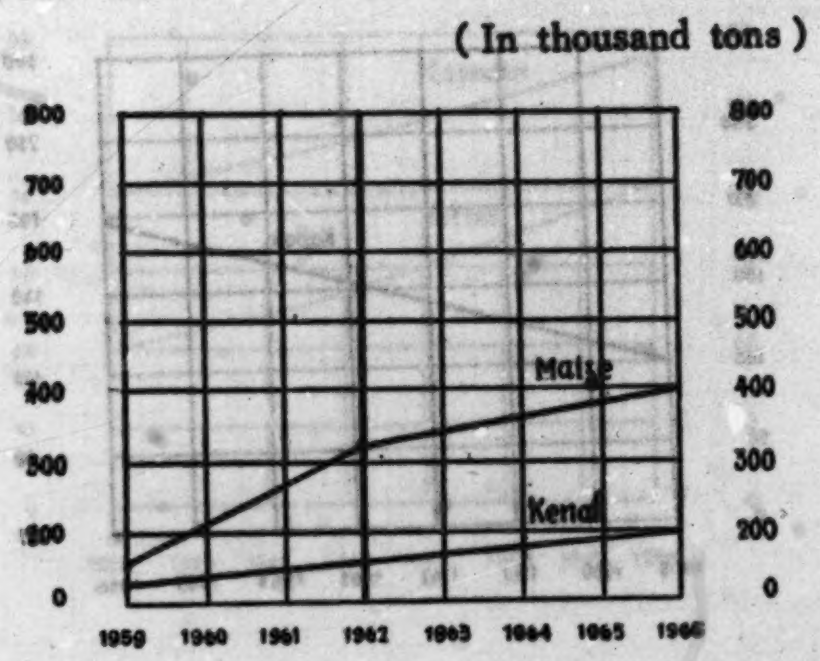
1/ 1960 statistics

2/ Soybeans, peanuts, and mung beans.

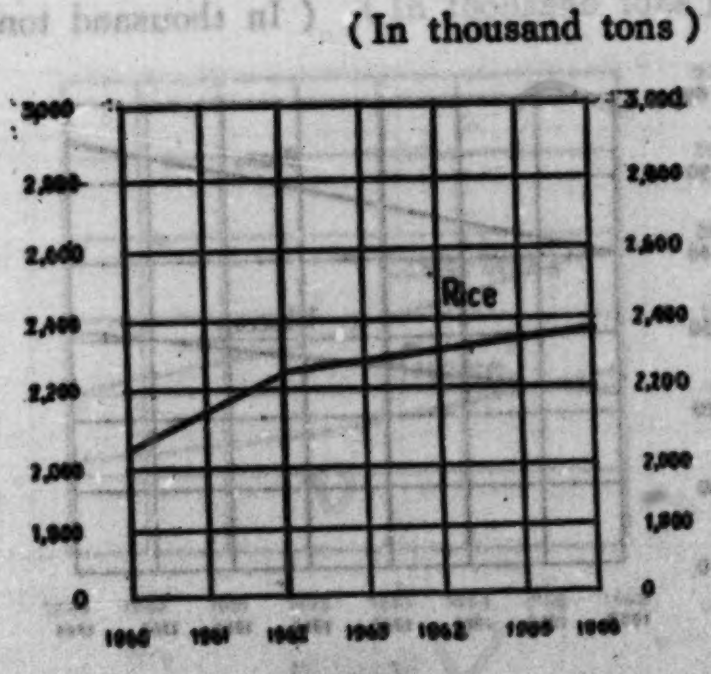
3/ In sugar cane promotion the Government aims to promote better varieties to increase sugar content. Sugar refineries will be encouraged to employ better machinery.

**Source :** Agricultural Statistics, 1959, Ministry of Agriculture.

## Chart 1 : Production targets of maize and kenaf in the Northeast



## Chart 2 : Production target of rice in the Northeast



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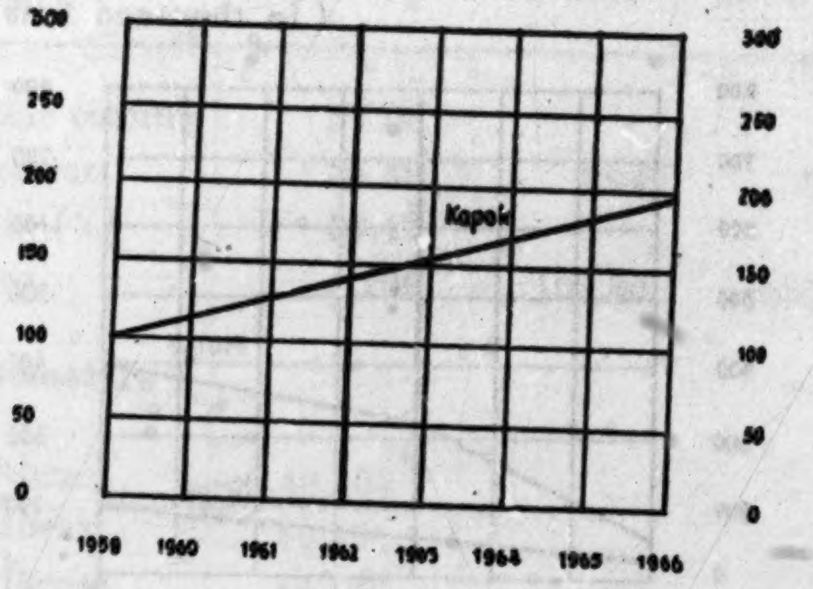
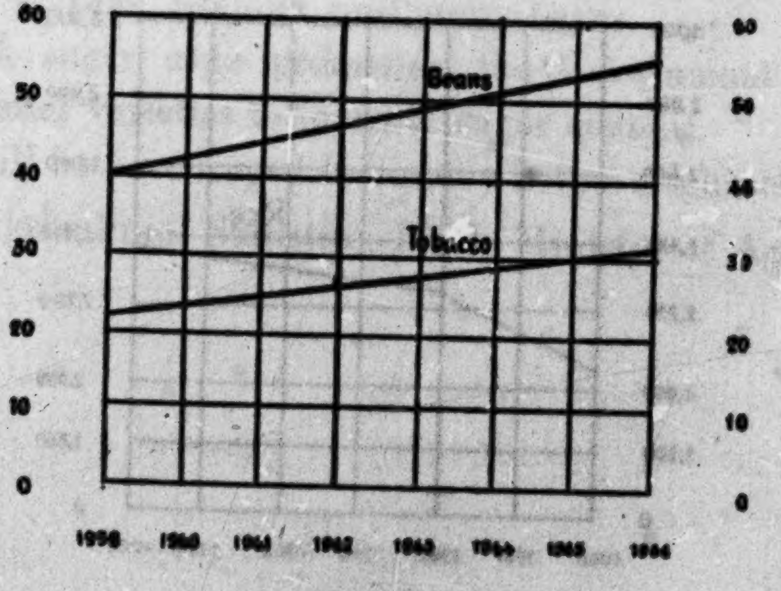
### Chart 3 : Production target of kapok in the Northeast

( In thousand tons )



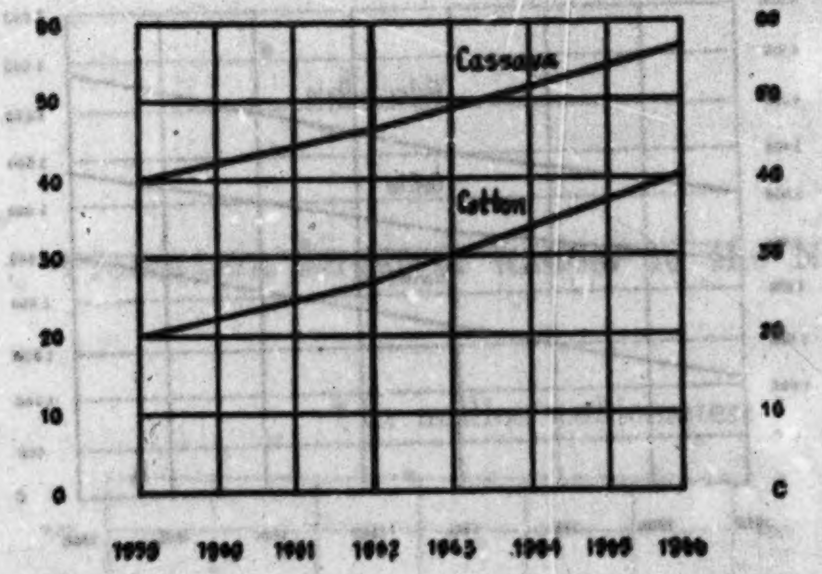
### Chart 4 : Production targets of beans and tobacco

( In thousand tons )



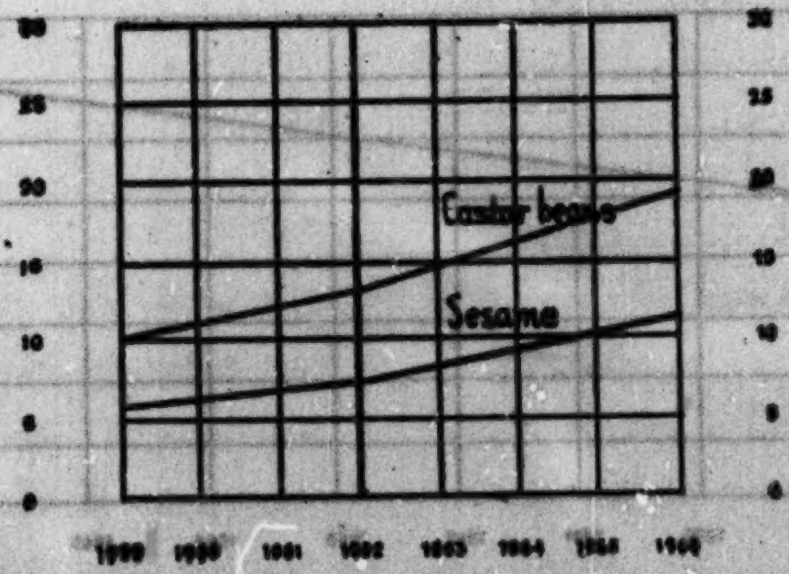
### Chart 5 : Production targets of cassava and cotton

( In thousand tons )



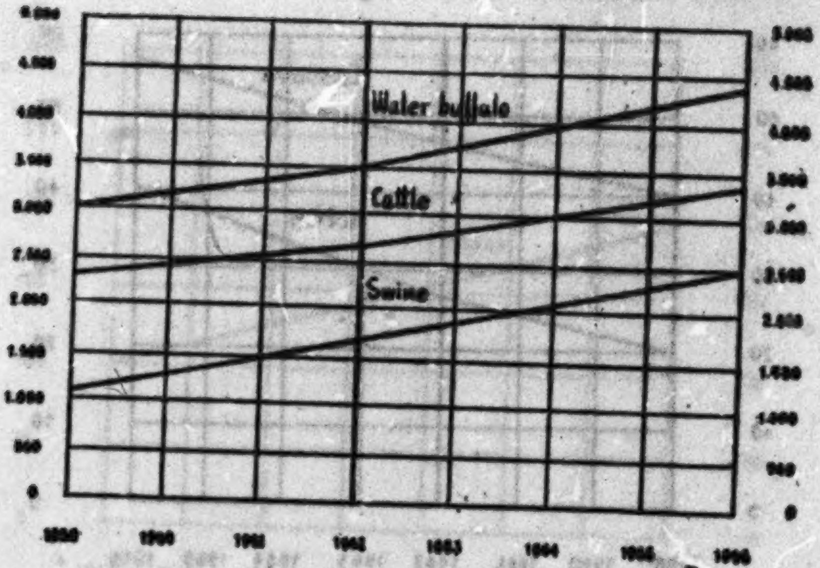
### Chart 6 : Production targets of castor beans and sesame in the Northeast

( In thousand tons )



## Chart 7 : Production target of livestock in the Northeast

( Thousands )



## Chart 8 : Production target of inland aquatic animals in the Northeast

( In thousand tons )

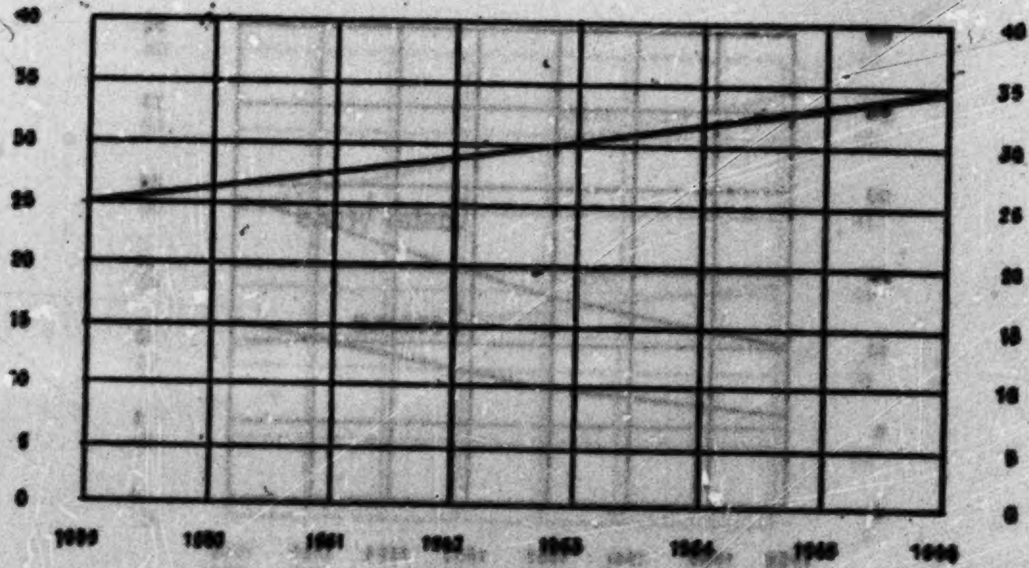
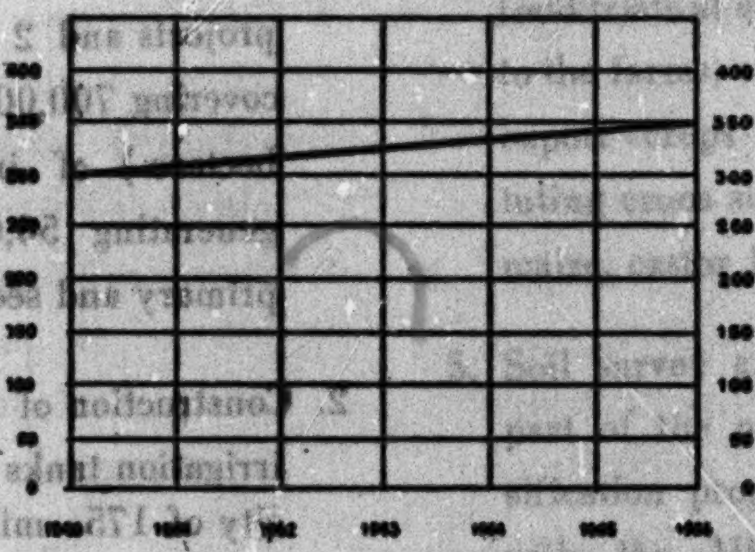


**Chart 9 : Production target of lumber in the Northeast**

(In million cubicmeters)



# Targets in the Public Sector

Targets in the public sector are the expected results of the work to be undertaken by the Government under the Northeast Development Plan, divided by sectors and projects.

## 1. Agriculture and Cooperatives.

| Project | Target 1966 |
|---|---|
| *1. Irrigation* | 1. Construction of 5 multiple-purpose projects and 2 irrigation projects covering 700,000 rai (6.25 rai = 1 hectare) of irrigable land and generating 50,000 kilowatts of primary and secondary power.<br>2. Construction of 10 medium-sized irrigation tanks with storage capacity of 175 million cubicmeters and irrigable land of 100,000 rai.<br>3. Construction of 2-5 small irrigation tanks annually. |
| *2. Experimentation and Extension in Field Crops Production* | 1. Establishment of 3 agriculture experimental stations and 9 agricultural improvement units, each to act as an experimental and demonstration unit for 30,000 – |

**50,000 rai. Farmers' groups will be promoted**

2. **Establishment of 1 tractor station at Kalasin to assist farmers in land clearing in the area of 3,000 – 5,000 rai every year.**

3. **Establishment of 3 disease and pest control units with area coverage of 5 provinces each.**

4. **Setting up of mobile extension units to carry the results from field trials at experimental stations to the farms, especially promoting export crops and import-substituting crops such as kenaf, cotton, maize, castor beans, and kapok.**

5. **Soil survey and fertility tests as part of the nationwide land classification program in cooperation with the Ministry of Interior. Conservation of natural resources will be promoted.**

### *3. Silk Culture Promotion and Improvement*

**Improvement of 5 silk culture stations. The Ubol station is to be expanded into the main research station to carry on work on silkworm breeding and introduction of better varieties of mulberry trees.**

***4. Promotion of Rice Farming***

1. Producing enough high-quality rice seeds as stock for 13.5 million rai of rice land with the increase in production of 120,000 tons.
2. Promotion of dry season farming and strip farming on rice land in irrigated areas.
3. Setting up of rice disease and pest control units at rice experimental stations covering 1.5 million rai of damaged rice land every year.

***5. Promotion of Inland Fisheries***

1. Establishment of 9 fisheries stations to increase fish stock in irrigation tanks and natural waters, and to promote fish ponds.
2. Survey and improvement of 300,000 rai of natural ponds and swamps and propagation of fish in these areas.

***6. Livestock Development***

1. Improvement and expansion of livestock stations so as to have sufficient breeding stock for farmers, especially cattle, swine and poultry.
2. Increase in the number of swine breeding centers in every province. There should be no less than 10 centers in each of the provinces.
3. Accelerating the work on livestock

emasculation and setting up of 3 artificial insemination centers.

4. Control and elimination of animal diseases by improving veterinary service.

5. Setting up of public grazing lands in irrigated areas and natural locations to be stocked with high-grade pasture and forages. Each province should have at least one public grazing land. In addition, there should also be 3 animal feeds and feeding stations.

## *7. Forest Protection, Improvement, and National Parks*

1. Conservation of 40 million rai of forestland.

2. Protection of 40 million rai of reserved forests under the land classification program by setting up protection units.

3. Improvement of watershed areas and valuable forests such as pine forests in Srisaket and Ubol. The Forestry Department will also grow 5,000 rai of teak and 10,000 rai of other trees in plantations, and improve 500 square kilometers of natural forests every year. Three national parks will be set up at Pu Kadung, Loey; Kao Yai, Nakorn Rajsima; and Kao Pupan,

| | |
|---|---|
| | Sakol Nakorn. Two wildlife refuges will also be set up. |
| *8. Research in and Promotion of Lac Culture* | Expansion of brood lac farms by 15 plots every year and greater research on processing of seed lac and powdered lac. The Department of Farming will assist in combatting lac diseases and pests. |
| *9. Cooperative Development* | Improvement of credit and marketing cooperative societies and expansion of land cooperatives in 200,000 rai of irrigated land. |
| *Agricultural Credit* | Setting up of a loan fund for Northeastern farmers as part of the proposed Bank for Agriculture and Cooperatives. |

## 2. Industry and Power

| Project | Target 1966 |
|---|---|
| *1. Survey and Development of Underground Water* | Digging of 200 artesian wells annually. |
| *2. Mineral Survey* | Regionwide survey of minerals and raw materials with assistance from foreign sources, especially at Loey. The regional mineral survey center is to be set up either |

|  |  |
|---|---|
|  | at Loey or Khonkaen. Exploration for lignite, rock salt, and building materials will be carried out. Private interests will be encouraged to explore for petroleum. |
| ***3. Geophysical Survey*** | Regionwide geophysical survey with foreign assistance. |
| ***4. Energy Survey*** | Regionwide survey of energy sources and demand including power distribution systems. Comprehensive surveys will be made on Pamong and other dam sites with foreign assistance. |
| ***5. Establishment of a Thermal Power Plant*** | Establishment of a large thermal plant to supplement hydropower pending a thorough survey by a respectable authority. |
| ***6. Promotion of Home Industry*** | Promotion of home industry with technical assistance from foreign countries. There will also be set up a prototype production and designing center. |
| ***7. Industrial Estates*** | Establishment of industrial estates in this region to promote industrialization along the line of successful similar ventures in other countries. |

## 3. Transport and Communications

| Project | Target 1966 |
|---|---|
| *1. Highways* | 1. Construction of 4 highways with the total distance of 965 kilometers.<br>2. Improvement of 6 highways with the total distance of 1,542 kilometers.<br>3. Joining the Northeast with the Eastern Seaboard by a major highway. |
| *2. Railways* | Completion of the remaining 189 kilometers of the Kaengkoi – Buayai line with future extension to Mukdaharn, another 280 kilometers, envisaged. |
| *3. Air Transport* | Construction of 4 high - standard airfields making the total of 7 and construction of 8 medium - quality airstrips. |
| *4. Telecommunications and Communications Media* | Improvement of 15–20 district post offices and setting up of a regionwide communication network covering more remote areas. A regional radio and TV station is to be established in Khonkaen. |

## Highways Target

| Project | Distance (Kilometers) | Remark |
|---|---|---|
| ***Construction*** | | |
| 1. Buachum – Loey | 354 | External loans will be sought for the 4 highways |
| 2. Udornthani – Vangsapung | 121 | |
| 3. Lomsak – Chumpae | 151 | |
| 4. Chokechai – Dejudom | 339 | |
| Total | 965 | |
| ***Improvement*** | | |
| 1. Banpai – Ubol | 210 | Financing by budget |
| 2. Nongkai – Nakorn Rajsima | 414 | Financing by USOM grant |
| 3. Nakornpanom – Ubol | 250 | Foreign grants will be sought, if possible, for routes 3 and 4 |
| 4. Loey – Khonkaen | 209 | |
| 5. Banpai – Nakornpanom | 299 | Foreign loans will be sought for routes 5 and 6 |
| 6. Udornthani – Sakol Nakorn | 160 | |
| Total | 1,542 | |
| Grand total | 2,507 | |

**Note :** The Northeast – Eastern Seaboard Highway is not listed, since almost the entire length will be in the Southeast.

## 4. Community Development, Land Use, and Public Utilities

| Project | Target 1966 |
|---|---|
| *1. Community Development* | Adjustment of the concept of community development to meet the practical needs of Thai farmers in accordance with the resolutions made by the National Committee for Community Development. The areas covered will be raised from 183 to 520. Two technical centers will be set up at Ubol and Udornthani or Khonkaen to provide technical assistance and training to farmers. |
| *2. Self-Help Settlements* | Settlement of 20,000 families in the 9 existing land settlements and establishment of 1 hill tribe settlement at Loey. |
| *3. Land Classification* | Deciding once and for all the definite area of reserved forests and the land to be opened for settlement; the former is estimated at 40 million rai. Forest inventory will be made of reserved forests while soil fertility and survey will be made of land open for settlement. |

| | |
|---|---|
| ***4. Land Distribution*** | Distribution of already available land to small farmers at the rate of 100,000 rai per year at least. Most of the farmers are either squatters or shifting cultivators and should have land of their own. When the land classification project is completed the rate of land distribution will be increased. |
| ***5. Feeder Roads*** | Construction and improvement of 50 feeder roads totalling 2,000 kilometers in length. Only 600 kilometers will be covered during the Plan period. |
| ***6. Rural Electrification*** | Rural electrification of about 20 percent of the population in this region. Improvement will be made of distribution and sale systems. |
| ***7. Waterworks*** | Setting up of waterworks in communal centers with the water supply rate of 1,600 cubicmeters. In sparsely populated areas artesian wells will be dug. |
| ***8. Area Development*** | Development of Khonkaen and Sakol Nakorn as the urban centers of the Northeast according to proper city planning and with ade- |

quate facilities including roads. markets, and industrial estates. In longer run Udornthani and Mukdaharn will be considered.

## 5. Public Health

| Project | Target 1966 |
|---|---|
| ***1. Public Health Development*** | 1. Eradication of contagious diseases such as leprosy, yaws, tuberculosis, malaria, and intestinal worms. A testing center for lung diseases will be located at Khonkaen.<br>2. Setting up of first-class clinics in all districts (Ampurs) to serve as district hospitals at the rate of 3 to 4 every year. The problem of the supply of medical personnel remains to be solved, however.<br>3. Rural health and nutritional development as part of community development and health training in schools. |
| ***2. Improvement of Provincial Hospitals*** | Raising of standard of the 15 provincial hospitals. The number of beds is to be increased by 450. |
| ***3. Establishment of Regional Hospitals*** | Upgrading of 3 provincial hospitals to regional hospitals at Khonkaen, Nakorn Rajsima, and Ubol. |

## 6. Education

| Project | Target 1966 |
|---|---|
| 1. *Elementary Education* | Creation of schools with adequate teaching faculties to meet expected enrollment of 30,000 more students in advanced elementary education. |
| 2. *Secondary Education* | Raising the proportion of secondary school graduates vis–a–vis the whole country to 10 percent or 3,300 students. |
| 3. *Vocational Education* | Creation of more agricultural and vocational schools and upgrading the Surin Agricultural School to a regional status. |
| 4. *Technical Colleges* | Establishment of 1 more technical college later on in the Plan period. |
| 5. *Teachers' Colleges* | Establishment of 2 more teachers' training schools and upgrading the Mahasarakam Teachers' Training School to a teachers' college. |
| 6. *Northeast Institute of Agriculture and Mechanical Science ( A & M )* | Establishment of the Northeast Institute of Agriculture and Mechanical Science ( A & M ) at Khonkaen to be expanded into a regional university later on. |

# CHAPTER IV

## Development Expenditures and Sources of Finance

The Northeast Development Plan envisages considerable development outlays from two sources; domestic and external. Domestic financing for public development projects is to come from the national budget under three categories; the development budget allocated under the National Plan, the special funds to hasten development, specially provided by the Bureau of the Budget, and local currency counterpart funds for foreign grants and loans. The latter is not divisible by year, as foreign grants and loans are not provided according to a difinite time schedule. It is hoped that friendly nations will provide grants to Thailand for development of the Northeast as a special and urgent problem. This fund to be known as the Northeast Development Assistance Fund bears important political, military, as well as economic implications.

The Northeast Development Plan will succeed or fail depending upon the contributions from external sources in the from of grants and loans. Grants are requested insofar as they have intrinsic military value. As for loans, effort will be made to secure long-term, low-interest development or assistance loans. It is hoped that these loans will cover part of the local currency requirements and will be partially repayable in baht. Grants and loans for the Northeast will amount to approximately one half of the total external financing planned for the country during the five-year period. The extent to which they are forthcoming will determine the extent of the success of the Northeast Development Plan.

## Summary of the Development Outlays for the Northeast

1. The total development outlays equal 6,038.6 million baht or about 300 million dollars, broken into 2,193.6 million baht from the budget including counterpart funds, and 3,845 million baht equivalents of the foreign exchange requirement.

2. The foreign exchange requirement is expected to be fulfilled by 1,000 million baht in grants and 2,845 million baht in loans. The counterpart fund to be provided equals to 1,025 million baht.

3. The Government will have to levy new taxes or otherwise obtain greater revenue to the extent of some 200 million baht a year to be utilized as counterpart funds.

# The National Budget

## Part 1 : Development Outlays Provided Under the National Plan

( Baht million )

| Sector | 1962 | 1963 | 1964 | 1965 | 1966 | Total |
|---|---|---|---|---|---|---|
| Agriculture and Cooperatives | 45.2 | 48.2 | 62.4 | 69.3 | 73.8 | 298.9 |
| Industry and Power | 12.8 | 12.5 | 12.5 | 13.0 | 14.2 | 65.0 |
| Transport and Communications | 31.0 | 35.0 | 40.0 | 50.0 | 60.0 | 216.0 |
| Community Development, Land Use, and Public Utilities | 29.5 | 32.1 | 35.4 | 50.0 | 55.0 | 202.0 |
| Health | 18.2 | 20.8 | 16.3 | 17.0 | 17.6 | 89.9 |
| Education | 13.6 | 33.0 | 28.5 | 33.9 | 37.8 | 146.8 |
| Total | 150.3 | 181.6 | 195.1 | 233.2 | 258.4 | 1,018.6 |

Note ; Central funds for general administration, etc., not included.

## Part 2 : Special Funds to Accelerate Development

(Baht million)

| Sector | 1962 | 1963 | 1964 | 1965 | 1966 | Total |
|---|---|---|---|---|---|---|
| Agriculture and Cooperatives | 16.0 | 20.0 | 20.0 | 20.0 | 24.0 | 100.0 |
| Communitv Development, Land Use, and Public Utilities | 2.0 | 3.0 | 5.0 | 5.0 | 5.0 | 20.0 |
| Health | 1.5 | 1.5 | 2.0 | 2.0 | 3.0 | 10.0 |
| Education | 0.5 | 5.5 | 8.0 | 8.0 | 3.0 | 20.0 |
| Total | 20.0 | 30.0 | 30.0 | 35.0 | 35.0 | 150.0 |

## Part 3 : Counterpart Funds, 1962 – 1966

(Baht million)

| Sector | Counterpart Funds for Grants | Counterpart Funds for Loans | Total |
|---|---|---|---|
| Agriculture and Cooperatives | 19.2 | 370 | 389.2 |
| Industry and Power | 12.3 | 60 | 72.3 |
| Transport and Communications | 106.0 | 335 | 441.0 |
| Community Development, Land Use, and Public Utilities | 43.2 | 60 | 103.2 |
| Health | 6.9 | – | 6.9 |
| Education | 12.4 | – | 12.4 |
| Total | 200.0 | 825 | 1,025 |

**Note :** Only for new projects. The Government is expected to raise 200 million baht additional revenue as annual counterpart funds.

## Sectoral Budgetary Allocations

| Sector | Budget (million) | Ratio (%) |
|---|---|---|
| Agriculture and Cooperatives | 788.1 | 36 |
| Industry and Power | 137.3 | 6 |
| Transport and Communications | 657.0 | 30 |
| Community Development, Land Use, and Public Utilities | 325.2 | 15 |
| Health | 106.8 | 5 |
| Education | 179.2 | 8 |
| Total | 293.6 | 100 |

## Grants and Loans

### Part 1 : Grants Requested, 1962 – 1966

(Baht million)

| Sector | Current * | Additionl | Total | Ratio |
|---|---|---|---|---|
| Agriculture and Cooperatives | 31.5 | 96 | 127.5 | 10 |
| Industry and Power | 68.5 | 61 | 129.5 | 10 |
| Transport and Communications | 92.0 | 530 | 622 | 48 |
| Community Development, Land Use, and Public Utilities | 14.0 | 215 | 230 | 18 |
| Health | 45.0 | 35 | 90 | 7 |
| Education | 34.0 | 62 | 96 | 7 |
| Total | 295.0 | 1,000 | 1,295 | 100 |

* Estimated from USOM Project Agreements, FY 1961, for Defense Support and Technical Assistance, computed for five years.

## Additonal Grants Requested By Type, 1962 – 1966

(Baht million)

| Sector | Technical Assistance | Feasibility Surveys | Supporting Assistance | Total |
|---|---|---|---|---|
| Agriculture and Cooperatives | 91 | 5 | – | 96 |
| Industry and Power | 61 | – | – | 61 |
| Transport and Communications | – | 40 | 490 | 530 |
| Community Development, Land Use, and Public Utilities | 41 | 5 | 170 | 216 |
| Health | 35 | – | – | 35 |
| Education | 62 | – | – | 62 |
| Total | 290 | 50 | 660 | 1,000 |

## Part 2 : Development Loans Requested, 1962 – 1966

(Baht million)

| Sector | Foreign Exchange | Local Currency |
|---|---|---|
| Water Resources Development | 625 | 270 |
| Power | 240 | 60 |
| Highways and Railways | 1,340 | 335 |
| Feeder Roads | 240 | 60 |
| Agricultural Credit | 400 | 100 |
| Total | 2,845 | 825 |

## Total Development Outlays 1962 – 1966

(Baht million)

| Sector | Bubget | Grants and Loans | Total | Ratio (%) |
|---|---|---|---|---|
| Agriculture and Cooperatives | 788.1 | 1,121 | 1,909.1 | 32 |
| Industry and Power | 127.3 | 301 | 438.3 | 7 |
| Transport and Communications | 657.0 | 1,870 | 2,527.0 | 42 |
| Community Development, Land Use, and Public Utilities | 325.2 | 456 | 781.2 | 13 |
| Health | 106.8 | 35 | 141.8 | 2 |
| Education | 179.2 | 62 | 241.2 | 4 |
| Total | 2,193.6 | 3,845 | 6,038.6 | 100 |

# CHAPTER V

## The Northeast Development Projects

The Northeast development projects are divided into three sections as follows :

### 1. The Projects Under the National Economic Development Plan, 1961 – 1966

These are the projects that have already been incorporated in the National Economic Development Plan with definite objectives, methods of operation and budget allocations. Once successfully implemented they will contribute towards the fulfilment of the overall objectives as set forth in the National Plan. The idea of presenting them in separation is to indicate clearly how the National Plan is related to the Northeast and what projects are already in operation. These projects are classified under six sectors of economic activity : agriculture and cooperatives; industry and power; transport and communications; community development, land use and public utilities; education; and public health.

### 2. The Projects To Be Financed From Special Funds

In this section are those projects under the various sectors which purport to bring about greater and quicker results from the operation of the National Plan. They are to be financed by special funds the amount of which will be determined largely by financial position of the country.

The majority of such projects are those which will accelerate the work on agricultural research, experiment and extension, and those which involve small investments and are not eligible for foreign loans or grants.

### 3. The Projects Requiring Foreign Grants and Loans

These are large-scale projects which call for heavy capital investments and cannot be adequately financed with the funds appropriated under the budget. Also included in this section are projects which require financial and technical assistance from foreign countries, Most of the loan projects concentrate heavily on irrigation, power, transport, and communications. They are extremely vital to the achievement of the objectives set under the Northeast Development Plan.

The projects in the three sections, when integrated, will have the overall objectives as appear in Chapter II; the financial requirements estimated and the sources of finance are given in Chapter III.

# Section I

## The Projects Under the National Economic Development Plan

## I. Agriculture and Cooperatives

Most of the projects in this sector are related specifically to the Northeast; some of them will be executed entirely in this region. The principal objectives of the projects relating to agriculture and cooperatives are expansion of production and increase of yeild per rai at the rate of not less than 4 per cent perannum. The Northeast has problems unlike those of other parts of the country. In particular, the region is dry and arid; provision of water is, therefore, an important element of agricultural development which must be reckoned with. A solution to the water problem is deemed to be in irrigation, especially the construction of new irrigation tanks and the improvement of existing ones for greater effectiveness. The second step to be taken involves acceleration of the production of those crops which should have good market at home and abroad. This would be achieved mainly through research, experimentation, and extension. Next along the line of development are transportation and marketing. Last on the objective list is the establishment of processing industries which would utilize agricultural produce as raw materials. This would help provide employment and raise the standard of living of the people in accordance with the policy of national economic develepment.

The projects under this sector are divided according to the nature of work perfomed as follows :

### 1. Irrigation

There are three projects under irrigation :

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***1.1 Small and Medium Irrigation Tanks Project*** The Royal Irrigation Department has so far constructed 94 irrigation tanks in the Northeast. Out of this number, sixteen are medium tanks (storage capacity of five million cubic meters upward), whereas the remainder are small ones. Under the National Plan, ***2–5 irrigation tanks will be constructed each year.*** It is deemed desirable that the tanks thus planned should be of medium size or larger in order to ensure widespread benefit. These tanks rely for their importance on the fact that diversion dams have proved less effective in the Northeast owing to unfavorable topography. The Royal Irrigation Department has constructed six diversion dams in this region since 1932. Each of them is able to give irrigation water to only a limited area of land, rendering the investment therein uneconomical. Insofar as the existing tanks are concerned, full benefits have not yet been realized, mainly because the people do not understand the proper control in water use. The Northeast Development Plan thus has of as one of its objectives the construction by ***the Royal Irrigation Department of at least two medium irrigation tanks each year.*** Besides, it is proposed that consideration be given to the improvement of water use control so that greater effectiveness could be achieved. In particular, a cultivated area of 300,000 rai should receive water from the existing tanks.

***1.2 Large Irrigation Tanks and Storage Dams Project*** Under the project, storage dams with capacity of 100 million cubic meters or more will be constructed. Survey has been completed by the Royal Irrigation Department in sixteen localities, giving a total storage capacity of 9,222 million cubic meters and an irrigable area of 1.74 million rai (See Appendix). According to the National Plan, the large storage dams will be financed with foreign loans and constructed in order of priority. The objective of the Northeast Development Plan in this connection reads: ***foreign loans will be requested for the construction of large irrigation tanks and storage dams in seven localities during the period under the Plan.*** In fulfilling this objective, the work will be undertaken in coordination with the National Energy Authority and in conformity to the details given in the section of the projects to be financed with foreign loans and grants (Section III). Another important objective of this project is the construction of storage dams and irrigation tanks which would operate in conjunction with the Mekong Development Project.

## 2. Agricultural Extension

Under this activity there are three projects as follows:

***2.1 Field Crops Research and Experiment Project*** Under the National Plan, the Farming Department is to undertake research and experiments in the five agriculture stations that have already been established in the Northeast. As regards new stations, the form taken would be that of a comprehensive agriculture station. They would be established with external assistance for demonstration purposes in the same manner as the one which is now being set up at Huay Sithon, Kalasin, with the assistance from United Nations Special Fund. Emphasis will be placed on those crops which could be profitably marketed abroad, such as maize, kenaf, castor beans, kapok, cotton, tobacco, and various beans. Advice in this connection will be given by the Committee on Important Field Crops Promotion, Ministry of Agriculture. Research and experiment will be undertaken along side with extension work. The number of extension workers will have to be increased for the purpose. Extension work represents, by far and large, an attempt at educating farmers in the proper use of seeds and fertilizers in mechanization, and in crop rotation. This project is divided into the following sub-projects:

***a. Land Clearing and Ploughing Project*** It is estimated that an area affected under the project will be 3,000 – 5,000 rai each year. With the establishment of an equipment center at Kalasin, a larger area will be brought under the scheme.

***b. Plant Disease and Pest Control project*** Three mobile units for suppression of plant diseases and pests will be established at Nakorn Rajsima, Roi-et and Udornthani with a view to speedy eradication of plant diseases and pests, such as castor bean worms.

***c. Cotton Promotion Project*** With reference to the National Plan, the cotton growing areas in the Northeast will be expanded, particularly in Loey, Khonkaen, Udornthani, and Nakornpanom. The main problem regarding the expansion of cotton production is to be solved by setting up large industial plants which would utilize cotton as raw material. This project is regarded as a main one, since it will bring into existence textile industry which is likely to play an important part in the Northeast development.

***d. Staple Crops Extension and Improvement Project*** The purpose of this project is to encourage people in the Northeast to practice diversified farming. Since the fact that regional, provincial, and district extension officers are extremely busy with routine work represents the main obstacle in this connection, mobile extension units will be put into operation, with emphasis on major field crops which are highly demanded. In all cases, marketing problems will be taken into consideration to the farthest extent possible. Moreover, organization of farmers' groups will be encouraged.

***e. Soil Fertility Survey and Research Project*** Research will be undertaken with a view to encouraging proper use of soil and fertilizer by the farmer, consistent with conservation principles and practices. This project will operate in coordination with the land capability classification survey project. Attention will be given especially to the use of cover crops and fertilizer in cassava growing.

***2.2 Northeast Agricultural Development Project*** The project aims at enabling the farmers to grow field crops in place of or in rotation with rice properly. It will operate through agricultural improvement centers where permanent staffs carry out field demonstrations for the benefit of the farmers. The staff of the centers also performs the duty of extension workers in encouraging the farmers to put what have been demonstrated to them into practice. The success of the project, therefore, depends largely on the quality of the staff. At present there are seven agricultural improvement centers in the Northeast. According to the Northeast Development Plan, ***each of the 15 provinces in the region will have an agricultural improvement center*** and special attention will be given to the selection of personnel.

***2.3 Silk Research and Extension Project*** Under the project, research, experiment, and extension will be carried out in the five silkworm culture stations. A successful operation of the project will prove extremely beneficial in view of the fact that silk is an export which has good and stable demand. In actual fact, the Ministry of Agriculture has been giving encouragement to silkworm rearing for many decades. But the effort put to the task was sporadic and the result has been consequently incomplete. The operation of the project under the Northeast Development Plan involves introduction of Japanese silkworms and popularization of Italian mulberry trees. At initial stages foreign experts will be requested and the silkworm culture station at Ubol is to be the center of extension and research.

## 3. Rice Extension

The executing agency is the Rice Department and the objective is to increase yield per rai by replacing rice with field crops on the marginal lands of about 1.5 million rai. However, the aggregate production of rice will be increased to the extent needed by the growing population. Three projects are listed under this head.

***3.1 Improved Rice Experimentation and Expansion Project*** Under the project, research will be undertaken to identify good varieties of rice which will be suitable for cultivation in the Northeast. Selected strains of seed will be propagated and distributed to the farmers. The project is further divided into two sub-projects.

***a. Seed Improvement Project*** The purpose is to carry out a comparative study on various types of seeds in twenty-five experimental plots in the Northeast each year. This will bring about good strains of seeds which give yields on the average 10 percent better than the native ones. The project aims at ***producing quality seeds for distribution to the farmers in the quantity adequate for a total area of 13.5 million rai of rice land in the Northeast namely 34,000 bags of seed (one bag for 400 rai).*** It is expected that rice production would be increased by 120,000 tons within the period under the Plan.

***d. Seed Experimentation and Multiplication Project*** This project is related to project *a.*, since it is concerned with research experiment in the four experimental stations in the Northeast. Its objective is the same as under project *a.*.

***3.2 Extension Work Project*** The purpose is to encourage the farmers in the Northeast to operate their rice farms efficiently from technical standpoints. Under this project the following sub-projects are placed:

***a. Extension Work Project*** Various methods such as suggestion, persuation, demonstration, and supporting assistance will be employed in the execution of this project. The main problem lies in the fact that agricultral officers have to do regular office work in the province and district, having little time for technical field operations. In solving this problem, a larger number of extension workers will be engaged to perform technical duties as distinct from administrative ones. They will be organized in mobile units, attached to the Rice Department and the Office of Regional Agricultural Extensions. During rice farming and alternate crops growing seasons, they will be sent to work in the field under the supervision of the Department's inspectors. The principle of extension work will be altered with greater emphasis on demostration, since distribution of publications and verbal persuasion have proven ineffective, given the habits of people in the region. The mobile units of the Ministry of Agriculture will have vehicles and equipments necessary for extension operation and also seeds for distribution to the farmers. In facilitating the task, the farmers will be encouraged to organize voluntary farmers' groups for the purpose of extension work and seed distribution.

***b. Fertilizer Distribution Project*** This is intended to encourage the farmers to apply fertilizer in rice growing. With reference to the National Plan, the work in this respect will take a normal course of expansion, since the results of experiment so far obtained have not yet revealed conclusively whether subsidization on a large scale would be worthwhile. Incomplete land classification makes it difficult to specify type and quantity of fertilizers which would yield an optimum result when applied to a given piece of land. With adequate experimentation a higher degree of expansion would be in order,

***c. Land Ploughing Service Project*** A larger number of equipments will be acquired to provide service in mechanical ploughing to the farmers. According to the National Plan, this activity is to take a normal course of expansion, since it is of secondary importance and involves large investment. If foreign assistance could be obtained for the purpose, support would be given to the establishmet of an equipment center in one of the experimental stations in the Northeast.

***d. Crop Rotation Extension Project*** The project aims at enabling the farmers to make use of crop rotation in cultivating dry rice land and in divesified farming. This would help the farmers to put their leisure to fruitful use, hence higher income for them. Continued support will be given to what has been planned under the National Plan. According to the National Plan, the work in this connection will be started in irrigation tank areas where rice farming is already in practice. The scheme is now under implementation at Huay Talard, Burirum. In order to achieve better results, an improvement will be effected through engaging extremely competent extension workers to do the job. This is necessary in view of the fact that the work is a new innovation and should assume great importance in the future.

***3.3 Rice Diseases and Pests Control Project*** According to the past experience, the rice area suffering from damages caused by diseases and pests is in the order of 450,000 to 1,500,000 rai each year and the Rice Department has been able to come to the rescue of only about 150,000 rai. Under the Northeast Development Plan, protection will ***be extended to the whole 1,500,000 rai*** by setting up three rice pest control units and putting into effective practice research findings of the Rice Disease Research Institute at Bangkhen.

## 4. Fishery Extension

The purpose in to encourage people to raise fish, build fish dams and improve fish habitats. ***The goal set under this head is the survey and improvement of a fishing area of 300,000 rai.*** In achieving this goal, the Fishery Department will expand fish breeding in irrigation tanks and canals, and build fish dams in public waters. Besides, there will be coordination with the work of community development in encouraging people to build fish ponds. It is anticipated that fish in natural waters will be depleted in the near future, the Fishery Department must, therefore, take steps to promote fish culture to such a wide extent as the fish raised would be sufficient for consumption in the whole Northeast. In this respect the six fishery stations will function as centers of operation and in conjunction with the Inland Water Fishery Institute to be established in the Central Plain.

## 5. Livestock Extension

Under this project popularization of animal husbandry will bring about a larger number of livestock. The livestock thus increased should be adequate not only for home demand but also for export. An attempt will be made by the Livestock Development Department to secure better breeds through an expansion of superior breeding stock, artificial insemination and castration of inferior animals. There are two projects under this head:

***5.1 Breed Improvement Project*** The project will operate through the six livestock stations in the Northeast among which the one at Tha Pra is the largest. Extension efforts will be directed especially to beef cattle and swine. The main trouble lies in the shortage of extension workers and the deficiency of feed in terms of quantity and quality. In solving the feed problem, three subsidiary feed stations are to be established. The targets set under the National Plan with regard to the number of animals refer to the whole country. Insofar as the Northeast is concerned, ***the livestock, especially cattle, buffaloes and swine should increase at the rate of not less than 5 percent per annum.*** Cooperation will be requested from the Ministry of Interior in expediting the collection of more complete statistics on animals. Apart from research and experiment undertaken in the livestock stations, the Livestock Development Department has a program of castration and artificial insemination. The work on castration will be accelerated through a campaign aiming at convincing the people of the benefits derivable thereform. Three artificial insemination stations will be established in the Northeast at Nakorn Rajsima, Khonkaen, and Ubol. The work of these stations will place emphasis on expanding the number of swine of superior breeds by setting up more swine improvement centers.

***5.2 Animal Diseases Prevention and Eradication Project*** The objective is to stamp out lethal animal diseases from the Northeast, especially foot and mouth disease, rinderpest, and anthrax. In executing the project, the animals will be put in quarantine at check points along the Thai-Cambodian border and on the way from the Northeast to Bangkok. Besides, vaccine and serum will be produced in quantity sufficient for meeting home demand and for some export.

### 6. Forestry and Forest Products Project

The purpose of this project is divided into two; first, to prevent the forest, an important resource of the country, from being destroyed for the benefit of a minority of individuals; and secondly, to ensure that the forest will be exploited for economic purposes in accordance with the techniques applicable to timber and forest product utilization and land conservation. In the Northeast valuable timber like teak is rare, but forests are still plentiful. If they were not vigorously protected, the country would suffer great damages. Should the forests be destroyed, the Northeast development projects along with those for the lower Mekong basin development would be doomed. Forest protection, therefore, ranks extremely high on the priority scale. The Forestry Department has three projects under this head.

***6.1 Forest Conservation Project*** This project is divided into two sub-projects:

***a. Forest Protection Project*** According to the National Plan, the Forestry Department will alter its protective techniques; mobile protection units each staffed with seven forestry and police officers will be employed in place of junior forest rangers who virtually work in isolation. Under the Nation Plan, about 300 of such units will be put into operation in the whole country; out of this number, ***fifty should be in the Northeast.*** These mobile units will also be responsible for the enforcement of the Forest Conservation and Protection Act as well as the Wild-life Conservation Act. In discharging this responsibility, forest police force will have to be increased.

***b. Forest Conservation and Protection Project*** This project will operate in conjunction with the land classification survey project. The survey will be made to determine the forest areas to be placed under conservation and protection. In 1959, a forest area of 324,925 rai was under conservation and another of 6,340,697 rai under protection. But a large part of the said forests have been illegally destroyed. ***The Forestry Department has the policy of placing a total forest area of 40 million rai in the Northeast under conservation.*** Within the planned period, this policy is to be implemented The Forestry Department in cooperation with the Ministry of Interior will make every effort to protect the forest placed under conservation, giving recognition to the fact that it is a valuable resource of the country. In placing forest under conservation, coordination will be taken with the land survey and classification project.

***6.2 Reforestation and National Parks Project*** Under this project plantations for teak, valuable timber, and pulp wood will be set up and natural forests properly maintained from technical standpoints. The targets set for tree planting in the Northeast are ***5,000 rai for teak and 10,000 rai for valuable timber;*** valuable fast-growing trees, such as pine and eucalyptus will also be planted. Moreover, improvement work will be carried out each year on a forest area of at least 100 square kilometers, and research on the protection of sources of water and on the assistance of hill tribes will be made more expeditious.

A national park will be established on the Phu Parn Mountain and two wildlife refuges at Dong Larn, Khonkaen and at Lam Narai, Chaiyapoom. The Forestry Department will prepare the projects and present them to the appropriate committees for approval at the earliest moment possible.

***6.3 Stick Lac Research and Extension Project*** Stick lac used to be an important export of the country and lac culture promotion has been an important policy of the Government. At present there are three lac culture stations in the Northeast. Under the Nation Plan, brood lac farms will be expanded at the rate of fifteen plots per annum. It is hoped that people in most villages in the Northeast will take up lac growing. The obstacles are numerous, for instance, the practice of growing lac in the forest in stead of on the trees grown for the purpose makes it impossible to have breeders for the following growing season; furthermore, the absence of experienced officers results in defective processing techniques, hence poor quality lac. In view of the fact that lac was once a good export and the world demand for it is high — in 1955 Thailand exported lac to the value of 251 million baht, to cite an example—it is advisable that the Forestry Department accelerates the work under this project to such an extent as *the value of lac export during the planned period will amount to at least 150 million baht each year.* To give reality to such a proposition, foreign aid will be requested. Insofar as eradication of lac diseases is concerned, coordination will be taken with the Farming Department.

## 7. Development of Cooperatives

Cooperation is a measure which, if properly applied, will be extremely beneficial to social and economic development of the Northeast. It has been many decadess ince it first took root in Thailand, but cooperation in its true sense is far from widespread and the economic benefit derived therefrom has been insignificant. Giving recognition to these facts, a proposition wherein the Ministry of Cooperatives is to improve its approach and methods of operation is put forward in the National Plan. The existing will be overhauled before further expansion is contemplated, and a special emphasis will be given to the training of cooperative members and officers on a comprehensive scale. As regards new cooperatives, production credit is to be viewed with favor. The Ministry of Cooperatives has three main projects by which the policy outlined above will be implemented

*7.1 Land Improvement Cooperatives Project* The Land Cooperatives Department has started taking over maintenance work on irrigation tanks from the Royal Irrigation Department. Included also in its activities are the construction of canals, ditches and dykes, and the bringing together of farmers for the purpose of facilitating agricultural extension work. The past performance has not been too satisfactory owing to the lack of personnel and necessary equipment. However, the fact remains that the success of tank irrigation based on other sources of water depends on the willingness and cooperation of the people in matters concerning water use and land improvement. The National Plan, therefore, specifies that the Land Cooperatives Department will organize land improvement cooperatives in the Northeast for demonstration purposes, insofar as finance and personnel would permit. This would bring 10 percent of the whole irrigation area under the scheme. Insofar as the Northeast is concerned, ***twenty-one land improvement cooperatives will be set up around the irrigation tanks in eleven provinces, having an area coverage of about 200,000 rai.***

***7.2 Credit Cooperatives Project*** -At the end of 1960, there were 3,707 credit cooperative societies in the Northerst out of the total number of 9,962 for the whole country. In other words 37 percent of these societies were in the region. However, the fact reveals that the preponderance of credit societies in the Northeast is accounted for by the prevalence of those which have been recently set up out of political considerations rather than as the result of good understanding on the part of the members or their popularity among them. These cooperatives are consequently weak; the members lack willingness and cooperative spirit which are essential in a cooperative enterprise. The members misbelieve that the cooperative is just a governmental business whose function is to distribute financial assistance to them. Entertaining this belief, they would avoid dealing with or resign from the society when its working capital was found inadequate and their needs could not be timely met. As a result, these credit cooperatives are faced with difficult financial problems. Moreover, despite the fact that the Government has been giving assistance to the cooperatives for many years, the economic benefit derived therefrom are not significant, nor do the members show any indication that they have grasped the true nature of a cooperative enterprise. The policy with regard to cooperative development under the National Plan is to urge the Ministry of Cooperatives to give a serious consideration to the improvement of its operations in line with modern practices and techniques. In this connection, it is recommended that production credit be viewed with a special favor and that the training of cooperative members be continued. Those societies which, though financially weak, could be restored to good standing will be reorganized. The Ministry of the Cooperatives has set the target for reorganization of the cooperative societies as 1,000 societies a year. Out of this number 400 should be in the Northeast.

However, the reorganization and expansion of the credit cooperatives, the establishment of new ones and the improvement of cooperative principles and practices as above described all call for a large budget which would not be immediately forthcoming. The National Economic Development Board, therefore, has the policy of supporting the establishment of an agricultural credit institution. In implementing this policy, the Government has set up a committee on agricultural credit to carry out the work necessary for the purpose. Since the said institution would depend on foreign loans and grants for its operation the objectives in this respect are given in the section concerned.

***7.3 Consumers' Cooperatives Project*** According to the statistics of the Ministry of Cooperatives, at the end of 1960 there were 50 marketing cooperatives for rice and other agricultural products in the Northeast. At present the performance of these cooperatives is still poor owing to the lack of good understanding in the principles of this type of cooperatives on the part of the members. Up to present the cooperative promotion fund has been used for their operations. The fund has been much depleted as the result of trading losses and slow debt collections. Under the National Plan, the Consumers' Cooperatives Department is, therefore, requested to speed up the work on reorganization of the cooperatives under its responsibility. In so doing, only those which are solvent or have regained strength will be given assistance.

## II. Industry and Power

Most of the projects in this sector are under the responsibility of the Department of Mines. Since the Government has the policy of leaving the large part of industry in the hands of private individuals, among whom would be foreign investors interested in operating an industrial enterprise under the Industrial Investment Promotion Act, the Government's activity in this sphere will be confined to raw material and power source surveys, research, and development in general. Public industrial enterprises in the Northeast are few and under the Northeast Development Plan no encouragement will be given to their expansion in the absence of the Government's specific policy necessitated by exceptional circumstances. With reference to the National Plan, the projects relating to the Northeast in this sector are as follows:

### 1. Mineral and Raw Moterial Survey Project

This project is divided into the following sub-projects:

***1.1 Underground Water Exploration and Development Project*** This project will be executed in coordination by the government departments under the Ministries of Interior, Public Health, and Industry. The purposes are to explore sources of underground water in the Northeast and develop them for public consumption, sanitation, and industrial uses. The project will operate in coordination with the community development project. In places where water is found to be in abundant supply, it will be used for agricultural purposes. ***The objective of this project is to develop about 200 underground water sources each year.***

***1.2 Mineral Resources Survey Project*** **Under the project, survey of mineral resources will be carried out in the Northeast, part of which is in the Lower Mekong Basin. As regards the mineral survey in the area that forms part of the Lower Mekong Basin, assistance is being received from the United Nations Special Fund. Aerial maps are used in the survey, geological and otherwise. Once the mineral is discovered, drilling will be made to determine the quantity and quality of deposits. The survey so far made indicates large mineral deposits in Loey. Among the minerals discovered in this province is iron ore with 60 percent iron content of about thirty-five million tons at Chiengkarn district. Copper is known to exist at Pak Chong, Nakorn Rajsima, whereas manganese, barite, gypsum, lead, and other minerals can be found in other parts of the region. At the initial stage the survey will be general in character. Once a mineral is determined to be in the quantity worth exploitings, a detailed survey will then follow. Foreign assistance will be requested for the project.** ***The objective of this project is to carry out mineral survey in the whole Northeast.***

**Rock salt and lignite are important raw materials, especially the former which is found to be prevalent in the region. Rock salt exists in great quantity at Udornthani; it could be an important raw material for chemical industry in the future. As regards lignite, some discovery was made at Kalasin, a detailed survey to be made will reveal the size of deposits. Apart from the minerals above mentioned, petroleum is another valuable material. There is already a policy whereby private propecting for petroleum is encouraged.**

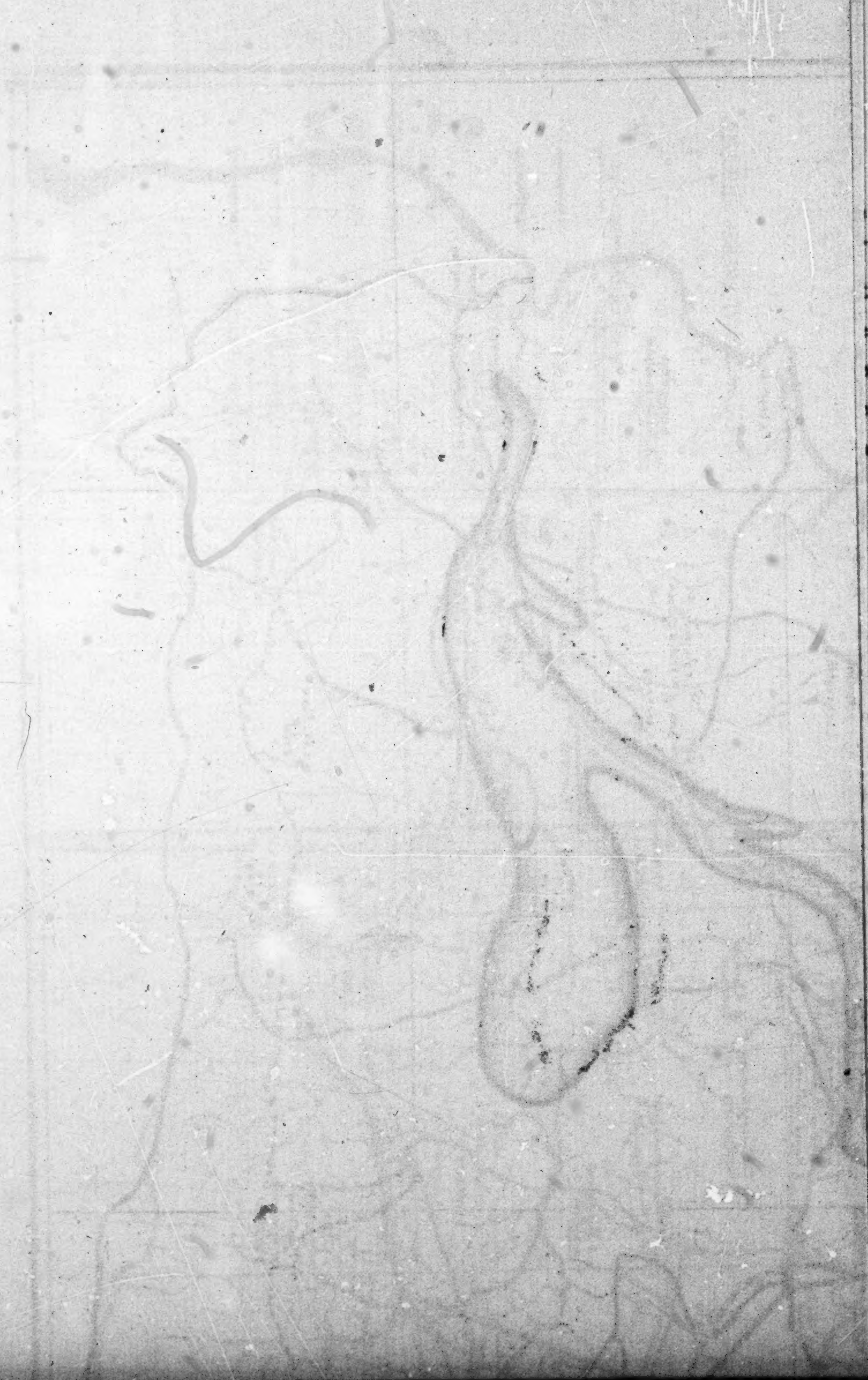
***1.3 Aerial Geophysical Survey Project*** **The whole country which is divided into six areas will be surveyed, starting with the Northeast. In the Northeast, an area of 1,160 square kilometers on the plateau of Nakorn Rajsima has been surveyed with the assistance of the United States. The objective of this project is to survey the whole Northeast. This could be fulfilled through foreign assistance.**

## 2. Power Survey Project

This comes under the responsibility of the National Energy Authority. The work in this connection is being undertaken specifically in the Lower Mekong Basin area. The purpose is to determine power demand, residential as well as industrial, in the Northeast. This project is extremely important in view of the fact that industry will not come into existence in the absence of adequate supply of power at low rates throughout the region. At present the power generating capacity in the whole Northeast is only 12,000 kw. which must be regarded as extremely small. It is estimated that power requirement of the region by the end of 1966 would be 60,000 kw. The objective of the project is, therefore, to survey the power requirement of the region, given the fact that the power rates could be reduced to a reasonable level. Various power sources, especially hydroelectric, will be surveyed with a view of making power available for consumption and water for irrigation in due course of time. As regards the management of public enterprises, greater use will be made of accepted principles and practices in order that they can become self-supporting and independent of the Government's subsidy.

Apart from the survey under the National Plan, the National Energy Authority has the authority to cooperate with Laos, Cambodia, and South Vietnam in conducting the survey under the Lower Mekong development project. It is expected that 1 – 2 million kilowatts of power, and water for irrigation of 3 – 5 million rai of land will be produced. However, this project is a long range one and only the survey of the Pamong dam is contemplated within the planned period.

In summarizing under the National Plan the objective with regard to industry is to confine the Government activity to survey and provision of facilities which will help promote industrial investments in accordance with the Government policy. An industrial undertaking calls for heavy investment and efficient management; it is best to leave it in private hands. However, once industry comes into existence, the Government will keep an eye on its progress and explore possibilities of rendering assistance, consistent with the Industrial Promotion Act. The industry will thus be put on a firm ground.



## III. Transport and Communications

**The development of efficient transport and communications is the most important part of the Northeast Development Plan. The high cost of transport presents an obstacle which must be overcome. Industrial development is hampered; prices of agricultural produce obtainable in the remote areas are far different from those ruling in the central markets due to the long distance of transport. So long as the means of transport remain in the defective state as is the case at present, the development of the Northeast cannot make much progress. There are two projects in this sector as follows:**

### 1. Transportation Project

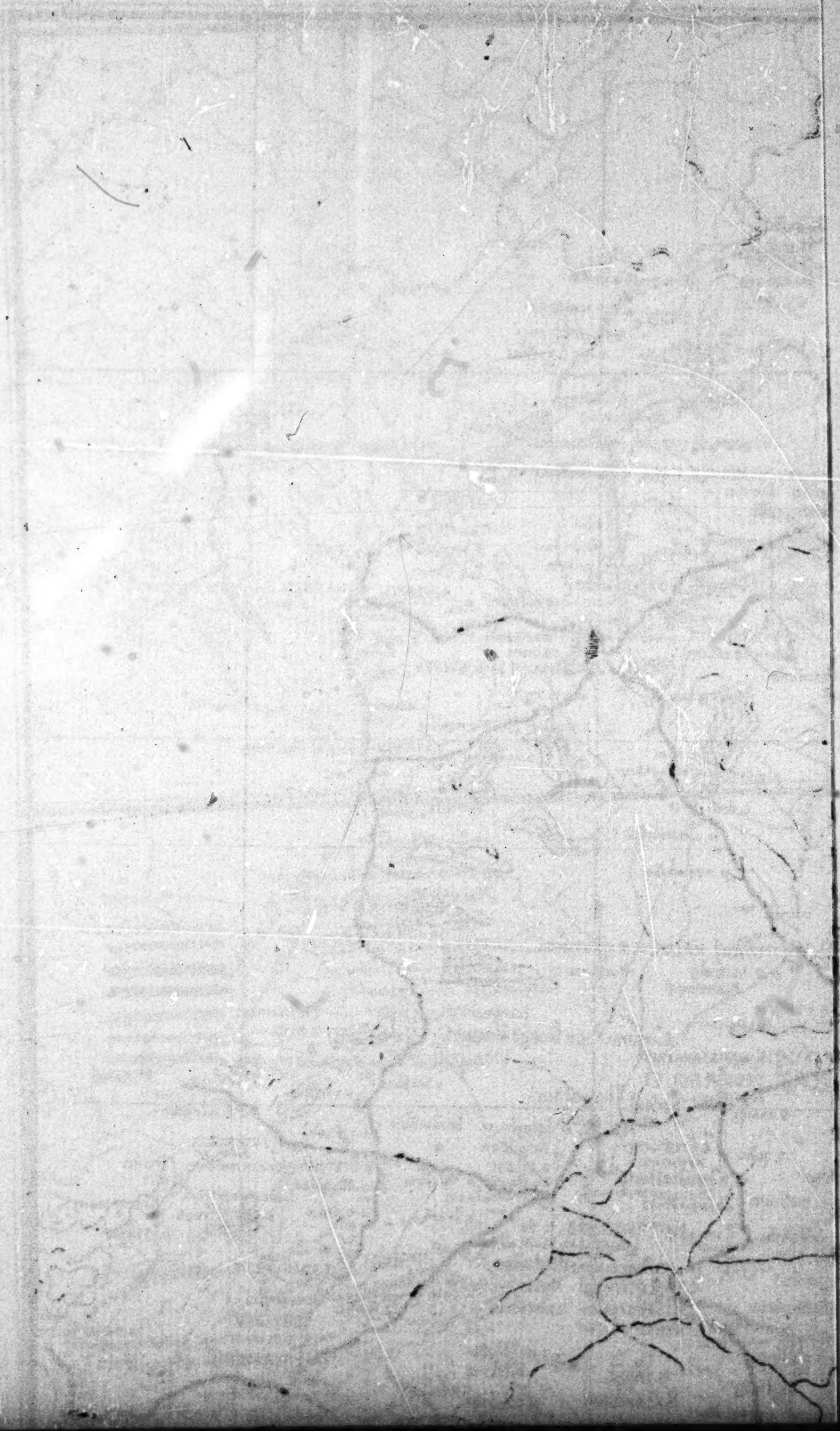
**This project is divided into three sub-projects:**

***1.1 Highways Project*** **Highways are the most important means of transport in the Northeast. This is due to the fact that only a few of the waterways in this region can be used for transportation. In the rainy season the rivers have rapid flow and in the summer they get dried up. The existing railway lines provide interprovincial connection for only eight provinces. Highways and feeder roads are, therefore, the only means of transport linking all of the provinces.**

**The National Plan attaches much importance to highways as can be seen from the large budget appropriation for the purpose. However, the money available still falls short of what is required even for the improvement of existing highways.** ***Improvement of Ban Phai – Ubol highway with the distance of 210 kilometers is the objective to be fulfilled through budget appropriations.***

In view of the fact that the budget funds will be inadequate for the improvement of other highways and the construction of new ones, foreign grants and loans will be requested for the purpose. The routes to be improved and constructed have not yet been determined due to the lack of proper surveys. The Government has requested experts to survey the routes, including those in the Northeast. So far it has been possible to specify 6 highways for improvement. These highways, when improved, will have asphalted surface. Loans will be used for the purpose, with the exception of 414 kilometers of Nakorn Rajsima – Nongkai highway which will be financed by grants. ***The highways to be improved have the total length of 1,542 kilometers.*** Four new highways to be constructed are Buachum – Loey, Udornthani – Wang Sapung, Lom Sak – Chumpae, and Chokechai – Dejudom; ***the total length is 965 kilometers.*** Foreign loans and grants will also be used for the new constructions. The planned improvement and construction, when completed, will result in speedy road transport at much reduced cost. At present the cost of transport is one baht per ton / kilometer. The details of loan and grant projects are given in Section III.

***1.2 Railways Project*** Apart from general improvement, the State Railways of Thailand has the plan to construct the railway lines of Kaengkoi – Buayai and Mukdaharn – Nakorn Panom. Under the Notional Plan, a loan is to be requested for the construction of Kaengkoi – Buayai railway the length is 272 kilometers, out of which 83 kilometers has been completed. The cost of construction of the remaining 189 kilometers is estimated at 316 million baht. Completion of the remaining part of this railway line is, therefore, one of the objectives listed in Section III. The rail transport will be made more speedy by the operation of this new line. At present the high gradient makes it necessary to divide up the train load. Although the replacement of steam engines by diesel ones and the improved techniques have made it less necessary to construct the line in question, the future volume of traffic estimated at 26 trains per day in 1966 makes it qualify for a foreign loan.



***1.3 Air Transport Project*** With reference to the National Plan, four airports in the Northeast will be constructed; these are the airports at Khonkaen, Roi-et, Sakol Nakorn, and Nakorn Panom. At present there are airports of accepted standard at Ubol, Udornthani and Nakorn Rajsima. Usable airports will be constructed in the remaining eight provinces. Foreign assistance will be requested for the purpose. Aviation radio stations in six provinces will be improved. The improvements effected under this project will contribute towards greater efficiency of the air transport.

***1.4 Land Transport Project*** The operation of land transport represents a joint venture of public and private enterprises. At present, the Express Transport Organization and the Transport Company Ltd. are already in operation. It is desirable that transport services be made more efficient; specifically, the rates should be brought down.

## 2. Telecommunications and Postal Services Project

The objective is to improve the post offices, telegraphic and other postal services. Under the National Plan ten post offices will be improved each year; out of this number, ***three should be in the Northeast.*** Besides, the telecommunications system which also extends to the Northeast should be completed in 1963. Provincial telephones will be brought under the management of the Telephone Service with the total number capacity of 740 In the future ***telephones will be put into operation in all the provinces.*** However, in installing telephones in any province, consideration must be given to costs and benefits. Under this project, five provinces will have telephone service in 1963, and ten more in 1966; the number capacity will be around 6,500 – 15,400. Nakorn Rajsima will be the regional center of telecommunications, with sub-centers at Ubol, Khonkaen, and Udornthani.

# IV. Community Development, Land Use, and Public Utilities

The work under the Ministry of Interior is of great importance in view of the fact that it deals directly with people. Although it concerns primarily with administration, economic benefits derived there from are many. The main obstacles experienced lie in the fact that the people have a low level of education and that they are overindulgent in outmoded beliefs and traditions which have proved to be a stumbling block on the way towards social progress. The Ministry of Interior has five projects under the National Plan.

## 1. Community Development Project

This project came into operation in 1958. Under the National Plan, a serious start is to be made in the Northeast. The project represents a coordinated effort on the part of various Government departments. The purpose is to produce well-trained community leaders, namely, community development workers who will impart technical knowledge to the people. The principles governing the operation of the project are self-help and awareness of community interest. At present there are eighty-three community development areas. Under the National Plan, ***the Northeast will have altogether 520 community development areas covering about 1,000 villages.*** The work will be expanded in steps, consistent with the readiness and the good understanding of the principle of self-help and mutual help on the part of the people. With regard to technical aspects of the work, at least two community development technical centers will be established with foreign assistance. This is significant in view of the fact that community development workers have to be selected and trained to perform field duties necessary for a successful realization of the project's objective.

**2. Self-Help Land Settlement Project**

This is divided into two sub-projects :

***2.1 General Land Settlement Project*** At present there are nine self-help land settlements in the Northeast. The total area of 791,000 rai could accommodate up to 26,000 families. But the land that has been actually allotted is only 113,640 rai for 4,389 families. Since the settlements still have plenty of land left unoccupied, no new land settlement will be established under the National Plan. ***However, work of improvement and expansion will be carried out on the land already at the disposal of nine land settlements in seven provinces.*** The lack of equipment and land clearing tools presents a problem. In the future foreign assistance might be received for the purpose of establishing an equipment center through the cooperation of the Public Works Department.

***2.2 Hill-Tribe Land Settlement Project*** With reference to the National Plan, this type of land settlement will be set up in the Northeast in so far as necessary. The first hill-tribe land settlement to be set up will be at Dong Prawat, Loey, where 219 hill-tribe families are to make permanent living on 5,000 rai of land. This will be an extremely good measure for the prevention of shifting cultivation. Besides, a good example would be set for those hill-tribes who live in the neighboring vicinity.

**3. Land Classification Survey Project**

This is divided into two sub-projects :

***3.1 Land Classification Survey Project*** Under the National

Plan, 50 percent of the total area of the country is to be conserved as forests. So far as the Northeast is concerned, ***the target with respect to forest conservation is the area of 64,000 square kilometers or 40 million rai.*** A survey for the purpose is to be expeditiously made. In carrying out the survey, the land which is suitable for settlement will be singled out from the forest area; soil maps will then be made and the exact locations of the forests to be put under conservation determined. The lands which are unoccupied and suitable for productive uses will be allotted to the people for settlement, and those placed under conservation maintained as permanent forests.

***3.2 Land Settlement Project*** According to the National Plan, about one million rai of land which is settled in small plots throughout the country will be allotted for settlement. Out of those plots which have already been surveyed, ***about 100,000 rai is to be allotted for settlement in the Northeast each year.*** Settlement on those plots which are larger than 1,000 rai will be postponed until completion of the land classification survey project. Moreover, aerial photography will be used to facilitate the work in connection with land settlements and cadastral surveys.

### 4. Feeder Roads Project

Provincial and rural roads are important and necessary as feeders to main transport routes. As it is at present, agricultural progress is confined to areas along both sides of the highways; further away from the main roads subsistence agriculture is the rule and commercial farming totally absent. Provincial and rural roads must of necessity be constructed as a high priority measure as quickly as possible. Most of them are to be financed with foreign loans. ***Under the National Plan the construction and improvement of 600 kilometers of provincial and rural roads will be carried out.*** This is regarded as the objective of the project. As a long-term project, provincial and rural

roads with a total length of about 2,000 kilometers will be improved and constructed.

### 5. Public Utilities Project

This is divided into two sub-projects:

*5.1 Provincial Electricity Project* At present all the fifteen provinces have electricity. With reference to the list in the Appedix, sixty-eight districts have power consumption of about 12,000 kilowatts or ten million kilowatt hours. The large part of the power consumed comes from power plants of the Provincial Electricity Authority. High power rates have kept consumption at a low level. Under the Northeast Development Plan, additional power will come from hydro-power plants. However, there will still be provinces and districts which have no access to such a source of power and must of necessity depend on power based on ordinary fuels. In any case, ways must be found to bring the power rates down. ***It is expected that by 1966 the power-generating capacity of the whole region should be around 60,000 kilowatts.*** The Provincial Electricity Authority must right now make preparations with regard to power transmission and distribution systems.

*5.2 Local and Provincial Water Supply Project* This comes under the responsibility of the Public Works Department. Under the National Plan, waterworks in 6 provinces will be expanded to ***achieve a doubled capacity of 1,600 cubic meters in each province.*** Apart from setting up water works in twenty-two municipal and sanitary areas, other sources of water such as underground water, wells and ponds will be developed to provide water for public consumption in places where water supply is not available. The water tanks of the Royal Irrigation Department will serve the same purpose.

# V. Public Health

The Ministry of Public Health has two development projects for the Northeast under the National Plan, they are:

## 1. Health Development Project

This is divided in to the following sub-projects:

***1.1 Contagious Disease Eradication Project*** The dangerous and contagious diseases in the Northeast are leprosy, yaws, malaria, tuberculosis, and parasitic diseases. Under the National Plan the Public Health Department has projects for the control and suppression of these diseases. These projects will be dependent on foreign assistance to a certain extent. Their objectives and methods of operation are as follows:

***a. Leprosy*** Measures to control this disease were put into operation in ten provinces five years before the inauguration of the National Plan. Under the National Plan the control will be extended to the remaining five provinces when additional control units are set up to operate througout the country in 1961. Subsequently, the existing work will be maintained and the disease kept under control, hence a complete realization of the objective.

***b. Yaws*** The work aimed at keeping this disease under control commenced in 1950. Survey and treatment were completed twice for the whole region; and seven offices of the control units were set up. Under the Nation Plan, survey and treatment will be carried out once more throughout the region. Sixteen mobile operational units, two control units, and one mobile research unit, working in cooperation with the United Nations officials, will be set up for the purpose. Besides, a diagnosis unit will be established at Udornthani. Once all these are completed, the objective will be fully realized.

*c. Malaria* This project is under execution with the assistance of USOM. It came into operation in 1951 and will be completed in 1968, when D.D.T. spraying will have been carried out in all malaria affected areas, including those in the Northeast. The population of twelve millions will be thereby protected against this disease. The result so far achieved could be indicated by the decline of malaria mortality rate from 250 per 10,000 population in 1951 to 38.9 in 1958. It is expected that this rate could be reduced to ten or less within the planned period.

*d. Tuberculosis* With the cooperation of the United Nations officials the work under this project has been going on in the whole region since 1953. By 1961 the population of 3[illegible]2 millions had been tested. According to the National Plan, additional population of 350,000 in the region is be tested each year and a test center for lung diseases will be set up at Khonkaen in 1962. The tests so far conducted reveal that 50 percent of the people in this region have contracted this disease. It is of great importance that remedial action be taken.

*1.2 Expansion of Health Center Project* The objective is to bring health centers in all districts in the Northeast up to the standard of a first-class health center having seven members on the staff. Prior to the National Plan twenty-four first-class health clinics were in existence; eighty-three more are to be set up. The Public Health Department has a fifteen-year project whereby this objective will be realized. During the period under the National Plan six first-class health centers will be set up each year; in six years thirty-six more of first-class health clinics will be brought into existence. With the budget funds already allocated for development purposes, the target thus set will be achieved. Should more funds be forthcoming the work in this connection could be speeded up somewhat. However, all the eighty-three health clinics cannot possibly be completed within six years owing to the lack of personnel. Second-class health clinics and midwifery centers come under the village health development project and will be staffed by the Public Health Department. In bringing second-class health clinics up to first-class standard, 800,000 baht will be needed for each of them. The lack of qualified doctors presents a big problem which must be solved by the Ministry of Public Health before expanding the operation.

***1.3 Village Health Development Project*** This project is executed in cooperation with USOM. The objective is to improve health and sanitary conditions in all villages in the Northeast. Two mobile training units will be set up for the purpose. 411 villages have been brought under the scheme, representing a complete realization of the objective. However, the existing work will be maintained and coordinated with the community development project. A program of nutritional development will be started and the school health program given emphasis.

## 2. Medical Development Project

This is the project of the Medical Department. It is divided into two sub-projects as follows:

***2.1 Provincial Hospital Improvement and Expansion Project*** At present the fifteen provinces of the Northeast have altogether sixteen hospitals. The objective of this project is to improve and expand all the existing hospitals and to build a new one at Yasothorn, Ubol. The number of beds will be increased by 450, making the total of 1,842. This is extremely small in view of the fact that, given the lowest proportion between bed and population ( one bed to 1,000 population), at least 8,000 beds would be required. The objective, however remains as above stated for the time being.

***2.2 Regional Hospital Establishment Project*** With in the period under the National Plan, three hospitals at Nakorn Rajsima, Ubol and Khonkaen respectively will be turned into regional hospitals. However, the projects which have been designed to bring about the proposed change are still deficient, for only the number of beds will be increased. Foreign assistance will be requested for the establishment of regional hospitals in accordance with the universal standard. In other words, they will have schools for training nurses, midwives, and assistant nurses.

In conclusion, the large part of the work under the responsibility of the Ministry will be executed with the budget funds allocated under the National Plan. Some projects, health clinic expansion and establishment of regional hospitals for instance, will be given special support.

## VI. Education

**Social services are placed under two heads; namely, education and public health. Education is of extreme importance in view of the fact that various development projects which call for heavy investment would fail, if the majority of people were uneducated and insufficiently trained to make effective use of the facilities provided or were disinclined to give cooperation in developing their own communities. Having realized the importance of education in the future, the Government set up the National Education Council to formulate plans and programs of education development according to the Government's policy. Under the National Education Development Plan, the Northeast is given the attention comparable to that paid to other regions. Under the National Education Development Plan 1961–1966 are the following projects.**

### 1. Primary Education Project

**Under the National Education Development Plan, compulsory education is to be entended to seven years. The purpose is to lift the standard of education of the people at large to such a level as they may be sufficiently educated and trained to be able to make a living as good citizens of the country. It is true that in the near future the Thai children will still be unable to receive education beyond primary school, owing to the fact that the Ministry of Education lacks money and personnel. This would be the case, even if the resources available were utilized to the full extent. Moreover, population growth at the rate of 2.8 percent per annum must be regarded as high. The last population census revealed that children account for 54 percent of the population. To give adequate education to the people is one of the major problems**

facing the Government. In the Northeast, where a third of the population lives, the problem is equally pressing.

According to the statistic available, at present only 30.5 percent of those who have finished compulsory education, namely the fourth year of primary school, continue their education in secondary school. In other words, seven out of every ten Thai children do not have education beyond the level that enables them to read and write, not to mention the children in remote areas, a large number of whom have no schooling whatsoever. Under the National Education Plan, the number of those who complete primary education would increase from 500,000 to 800,000 and the percentage of those who continue their education beyond primary level would go up from 30.5 to 40, representing an absolute increase for the whole country of 165,000, which is the difference between 155,000 in 1961 and 320,000 in 1966. This is far too small, considering the total number of children under school age. Insofar as the Northeast is concerned, the Government will have to invest not less than sixty million baht within six years to fulfil this modest objective; this amount does not include general administrative expenses, nor central expenditures. The objective of the Northeast Development Plan with regard to this project is ***to increase the number of students in upper primary classes (prathom 5–6–7) by 30,000 within six years.***

Besides, under the National Education Plan, emphasis is placed on some minor projects which are significantly related to primary education. These are the projects for the establishment of schools in remote areas and for the promotion of private schools. They are of special importance to the Northeast; under the former, specialized schools will be set up for children in places which are inaccessible by existing means of transport. One welfare school, one elementary school for villages with few children, and one school for the mentally retarded will be set up in the Northeast within the planned period.

### 2. Secondary Education Project

The objective is to set up more secondary schools (Mathayom 1–5) with emphasis on the expansion of pre-university classes. Given the population, the Northeast ought to have about 30 percent of those who have completed pre-university classes in the country. But in actual fact, the percentage is only 4.61 in 1958 and is estimated at 6 in 1961. ***The objective in this connection is to increase this percentage by 1966 to 10, which represents 3,300 students in absolute terms.*** Private cooperation will be relied upon to a great extent for the fulfilment of this objective. It is expected that in 1966 about 3,300 students in the Northeast would complete pre-university classes in governmental and private schools. As has been the case up till now these students come to Bangkok for university entrance examinations. Those who are successful and complete the course at the universities mostly in Bangkok for work in stead of returning to their native towns in the Northeast. Those who are unsuccessful in the first university entrance examination stay in Bangkok with a view to making more attempts, hence overcrowdedness of the city which is extremely undesirable. To get out of this dilemma, ***a higher education institute will be set up in the Northeast.*** In the Institute only courses of study and training which are suitable for employment in the Northeast will be provided. Since this is a special project which does not come under the National Education Plan, special budget funds and foreign assistance must be resorted to. Preparations for the establishment of this Institute are the responsibility of the ministries concerned. Pre-university classes will be opened in twelve schools and expanded in eighteen schools.

In due course of time the Government will give support to the establishment of a regional university to provide place for those who complete pre-university classes.

### 3. Regional Education Development Project

At present the Ministry of Education divides the Northeast into educational regions 9,10 and 11, with centers of operation at Udornthani, Ubol, and Nakorn Rajsima. All the three regional centers have the same objectives; these are to improve the quality of education in the respective regions and to coordinate with private individuals in matters concerning education. The objectives peculiar to each region are as follows:

a. Regional Education Center 9 at Udornthani has a special objective of providing assistance to the Kingdom of Laos and vocational training to the Thai who will replace the evacuated Vietnamese.

b. Regional Education Center 10 at Ubol undertakes the work concerning education, health, and community development. It operates in coordination with TUFEC.

c. Regional Education Center ll at Nakorn Rajsima concentrates its efforts on solving eduational problems of the poor areas and on studying the movement of students from the Northeast to Bangkok for further education.

These centers are equipped with buildings and constructions such as teachers' hall vocational school, teacher training school, kindergarten school, and others. The objective of this project is to fully equip the three centers, to accelerate research work, and to provide a close coordination between the centers and community development technical assistance centers.

## 4. Vocational Education Project

This project is closely related to the national economic development, since the objective with regard to education under the National Plan is to encourage the young people to receive such training as will give them stable and honest employment with reasonable income. This will help relieve unemployment, a problem which is likely to be more pressing in the future and has to be solved. Under the National Education Plan, this project is divided into the following sub-projects:

***4.1 Improvement and Expansion of Upper Vocational Schools Project***
Insofar as the Northeast is concerned, emphasis will be placed on training in agriculture, mechanical engineering, and commerce. Commercial training will be given in trading centers of the Northeast in view of the lack of interest in trading business on the part of the people. A start might be made in the four trade schools now in existence.

***4.2 Agriculture School Project*** Under this project, welfare agriculture schools and agriculture schools of a new type will be set up to provide training in specialized fields. The former will offer instructions to members of self-help land settlements and the latter to the public in general. At least two schools of each type will be set up in the Northeast with emphasis on field crops and animal husbandry. The school of agriculture at Surin will be improved with a view to establishing it as a regional school of agriculture.

***4.3 Seato Technical School Project*** At present there are already five Seato technical schools in the Northeast. Three more will be set up at Khonkaen, Mahasarakam, and Surin, respectively. Cognizance will be taken of the employment opportunities available in designing the curriculum of training and in selecting equipments.

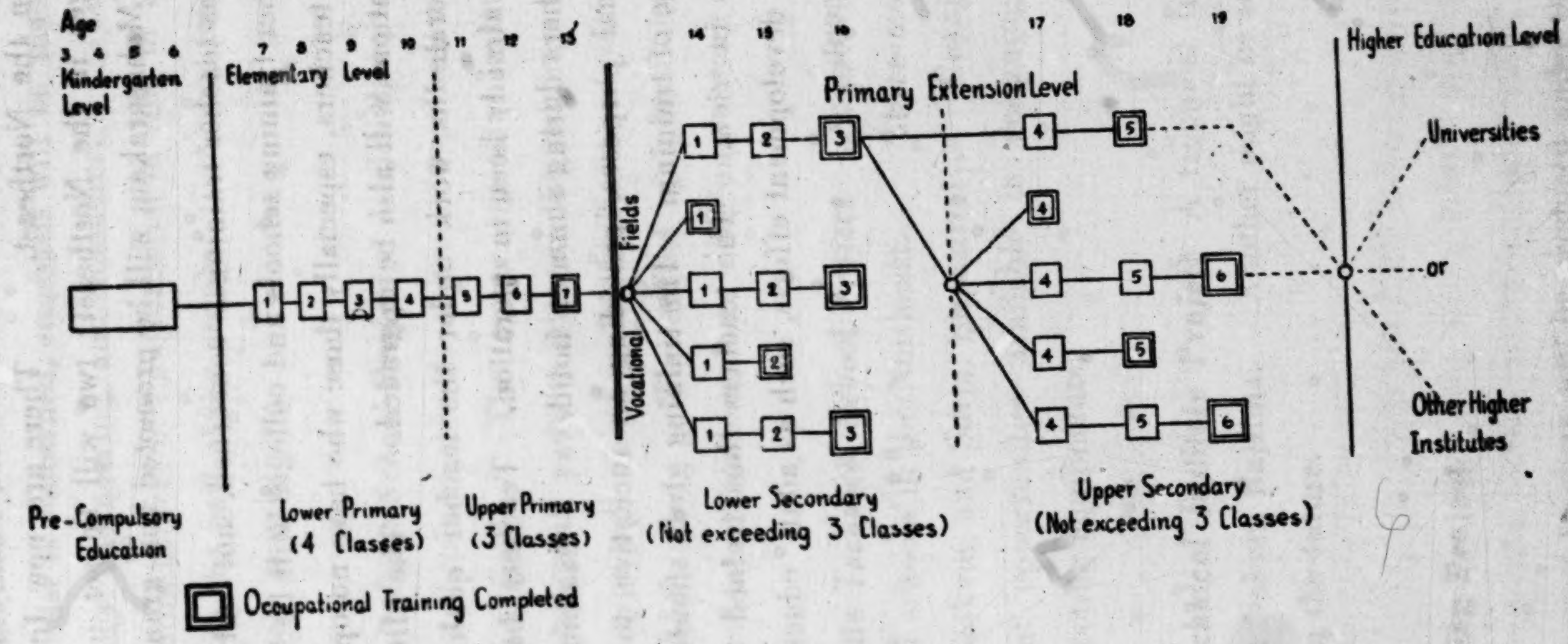
***4.4 Technical Institute Project*** A technical institute has already been established at Nakorn Rajsima. Another might be set up at Udornthani or Sakol Nakorn in the future.

## 5. Teacher Training Project

Two types of teachers will be produced under this project; namely, those who are trained for a degree at the college of education and those who are trained for a certificate at the teacher training school. With regard to the former there is still no need at present for a new college of education of Prasarnmit type in the Northeast. There are now four teacher training schools and colleges in the Northeast; two will be set up. The teacher training school at Mahasarakam will be promoted and granted college status.

So far as teacher training is concerned, not only the number of teachers from teacher training schools and colleges will be increased, but the quality of existing teachers, especially those who have no opportunity to study for higher qualifications will also be upgraded. The Ministry of Education will specially accelerate the work under the teacher qualification upgrading program which has already been in operation. Teachers' halls will be used for the training of teachers during summer holidays; examinations willalso be held for promotional purposes, providing an incentive to the teachers who attend such a course of training. The training given should be designed with the local conditions in view. The teachers thus trained will form a major force in community development efforts, such as adult education, agricultural and health development.

Chart : 1 National Education Development Plan, 1961 - 1966


Age
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Kindergarten Level
Elementary Level
Primary Extension Level
Higher Education Level
Vocational Fields
1 2 3 4 5 6 7
Universities
or
Other Higher Institutes
Pre-Compulsory Education
Lower Primary (4 Classes)
Upper Primary (3 Classes)
Lower Secondary (Not exceeding 3 Classes)
Upper Secondary (Not exceeding 3 Classes)
Occupational Training Completed

**Source:** Notional Education Plan 1961–1966

## Chart 2 : Northeast Education Development Plan, 1961 - 1966

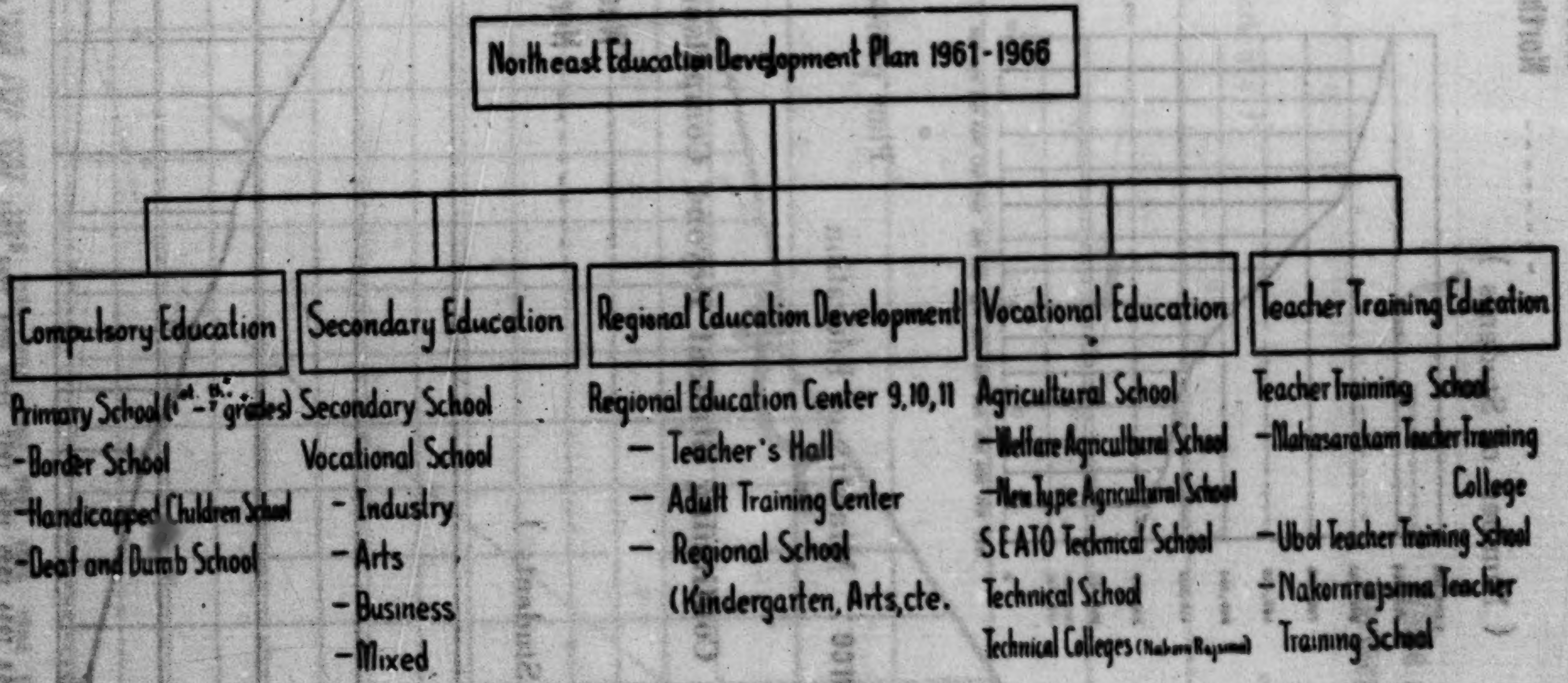
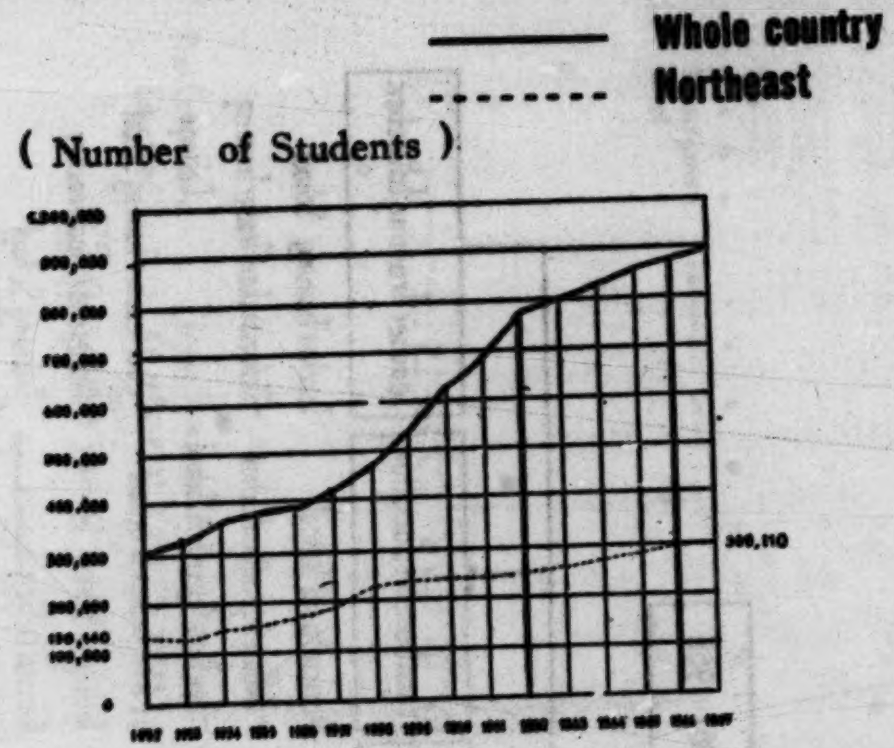

Northeast Education Development Plan 1961-1966
Compulsory Education
Secondary Education
Regional Education Development
Vocational Education
Teacher Training Education
Primary School (1st - 7th grades)
-Border School
-Handicapped Children School
-Deaf and Dumb School
Secondary School
Vocational School
- Industry
- Arts
- Business
- Mixed
Regional Education Center 9, 10, 11
— Teacher's Hall
— Adult Training Center
— Regional School
(Kindergarten, Arts, cte.
Agricultural School
-Welfare Agricultural School
-New Type Agricultural School
SEATO Technical School
Technical School
Technical Colleges (Nakorn Rajsima)
Teacher Training School
-Mahasarakam Teacher Training College
-Ubol Teacher Training School
-Nakornrajsima Teacher Training School

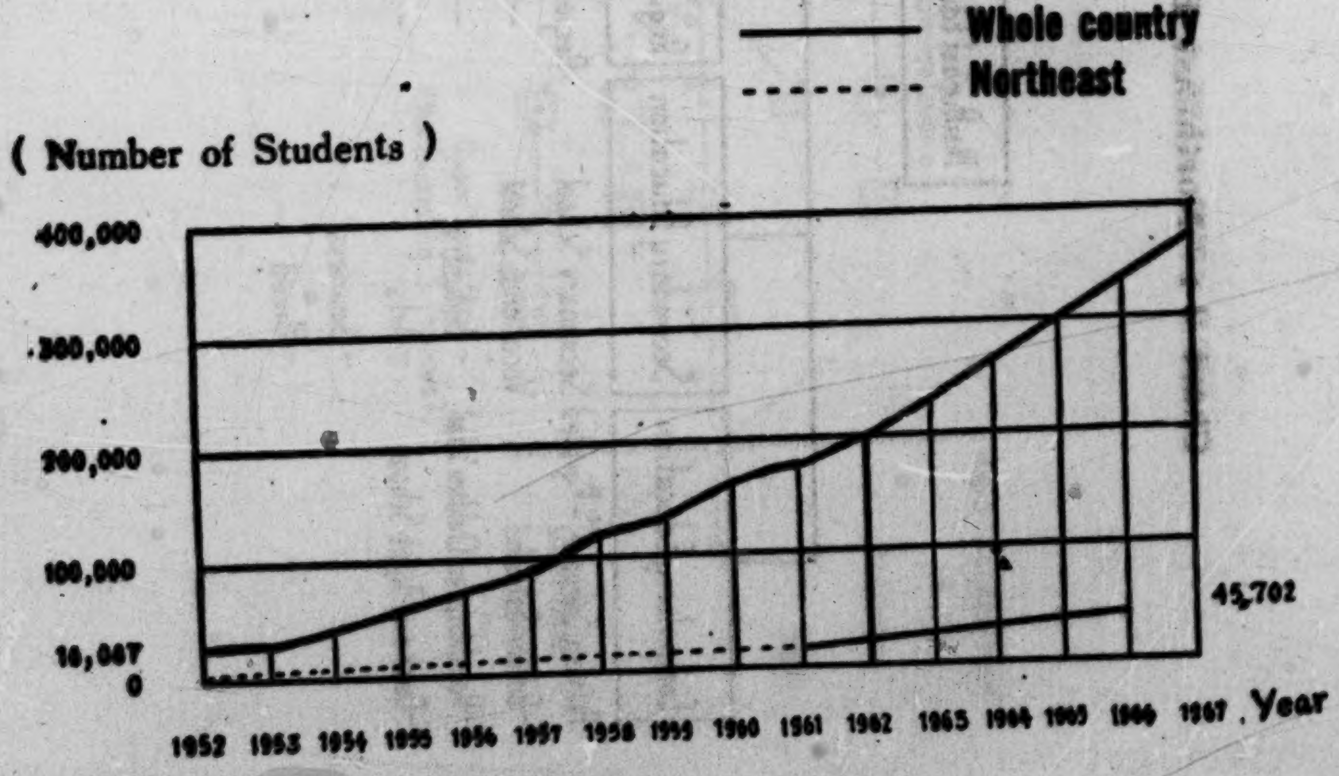
**Chart 3 :** **Number of Students Passing Compulsory Education**



Plan period

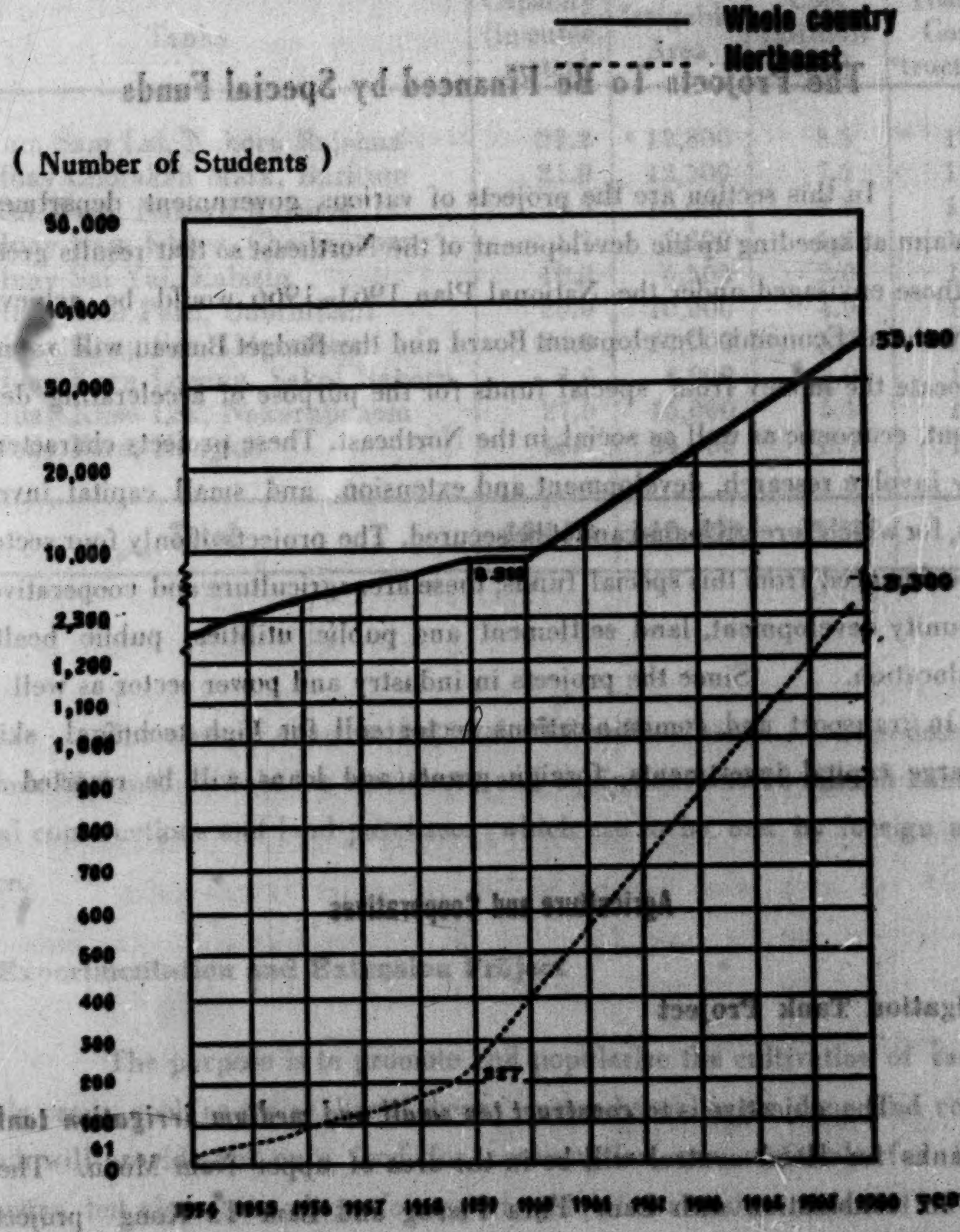
**Source :** Ministry of Education

**Chart 4 :** **Continuing Stndent Beyond Compulsory Education**



**Source:** Ministry of Education

**Chart 5 : Number of Students Passing Pre-university Level**



**Source :** National Education Council

# Section II

## The Projects To Be Financed by Special Funds

In this section are the projects of various government departments which aim at speeding up the development of the Northeast so that results greater than those envisaged under the National Plan 1961–1966 would be achieved. The National Economic Development Board and the Budget Bureau will annually allocate the money from special funds for the purpose of accelerating development, economic as well as social, in the Northeast. These projects characteristically involve research, development and extension, and small capital investments, for which foreign loans cannot be secured. The projects of only four sectors will be financed from this special funds; these are: agriculture and cooperatives; community development, land settlement and public utilities; public health; and education. Since the projects in industry and power sector as well as those in transport and communications sector call for high technical skills and large capital investments, foreign grants and loans will be resorted to.

### Agriculture and Cooperatives

**1. Irrigation Tank Project**

The objective is to ***construct ten small and medium irrigation tanks.*** Two tanks for flood control will be in the area of upper Nam Moon. These tanks, in conbination with Lam Phra Plerng and Lam Ta Kong projects, should be able to reduce about 60 percent of floods. Besides, the water from these tanks will be useful for irrigation, kenaf fiber extracting and retting and also for consumption and home use. The tanks to be constructed are given in the table below.

| Tanks | Capacity (in cubic meter) | Irrigable Area | Cost (million baht) | Year of Construction |
|---|---|---|---|---|
| 1. Lam Sam Lai, Nakorn Rajsima | 29.2 | 12,800 | 8.5 | 1962 |
| 2. Huay Chorakeh Mark, Burirum | 21.0 | 12,500 | 7.2 | 1962 |
| 3. Kut Wien, Nakorn Rajsima | 9.5 | 10,000 | 2.5 | 1963 |
| 4. Huay Nam Khiew, Chaiyapoom | 1.7 | 1,600 | 1.2 | 1963 |
| 5. Huay Sai Yai, Kalasin | 10.0 | 6,500 | 2.0 | 1963 |
| 6. Huay Sam Pard, Udornthani | 20.0 | 10,000 | 4.0 | 1964 |
| 7. Huay Kong See, Udornthani | 24.0 | 12,000 | 5.0 | 1964 |
| 8. Huay Karn Loeung, Sakol Nakorn | 8.6 | 8,000 | 3.0 | 1965 |
| 9. Huay Khee Lek, Nakornpanom | 27.0 | 15,000 | 5.5 | 1965 |
| 10. Huay Torn, Nongkai | 43.7 | 24,000 | 8.7 | 1966 |
| ***Total*** | ***194.70*** | ***112,400*** | ***43.60*** | – |

The costs of construction total 43.6 million baht. This does not include 13.6 million baht for machinery and equipment and 13 million baht for canal constructions and land purchases which are to be met by foreign assistance.

## 2. Experimentation and Extension Project

The purpose is to promote and popularize the cultivation of various staple crops, such as maize, kenaf, beans, castor beans, sugar cane and cotton, which will provide not only food for consumption, raw materials for home industry, but also commodities for export. Mobile extension units staffed with specialists in various fields will be set up for the purpose of extending results of research and experiment findings of the agriculture stations and the agricultural improvement units to farmers in the whole region through demonstration, seed distribution, and other extension techniques. These extension units will also help organize farmers' groups, Insofar as the administration of the project is concerned, the principle adopted will be the one that treats extension operations as a unified system, wherein the departments concerned work in cooperation. Coordination will also be had with the community development project. ***It is planned to expand the area under crops of good varieties to the extent of 150,000 to 200,000 rai each year.***

### 3. Northeast Agricultural Improvement Project

With reference to the data compiled by the Ministry of Agriculture, out of the total area under rice of 17 million rai, about five million rai each year fails to yield satisfactory results. It is deemed desirable that other crops, such as water melons, beans, sweet corn, etc., be grown in place of or in rotation with rice, or in strip farming. However, in places where upland rice farming is still profitable, rice planting will be retained. This is in consistence with a definite objective under the Northeast Development Plan, whereby the Northeast will be made self-sufficient with regard to food, Nevertheless, it is extremely desirable to have field crops grown in rotation with rice or in strip farming. There were six agricultural improvement units in the Northeast in 1961. ***Nine more will be set up to operate in an area of about 35,000 rai each year, hence 525,000 rai under fifteen units.*** A part from carrying out the work of agricultural improvement in the area under its responsibility, the unit will provide support to mobile extension units and community development workers.

### 4. Inland Fishery Promotion Project.

With reference to the findings of FAO, each person should consume on the average 20 kilogrammes of fish each year. Given this rate of consumption, the existing annual fish production of 25,000 tons in the Northeast will have to be increased to about 160,000 tons. It is, therefore, necessary to expeditiously expand fish breeding in natural waters, irrigation tanks, private fish ponds, and construct fish dams in suitable places. The success of the project depends largely upon fishery stations, ***nine more of which will be set up to provide a station to each province in the Northeast.*** Irrigation tanks and natural waters will be stocked with at least 500,000 fingerlings each year.

### 5. Livestock Promotion Project

The livestock stations that have already been set up, such as the ones at Sakol Nakorn and Ubol, will be improved with a view to making extension work more effective. The work on artificial insemination and improved breeding will be expedited; greater use will be made of sires of superior breeds. Extension efforts will be specially concentrated on dairy cattle, beef cattle, swine, and chickens. ***With regard to swine, more breed improvement centers will be set up; each province should have at least five centers.*** The quality of chickens raised will be improved through the use of genuinely superior breeders throughout the region. Encouragement will be given to the raising of ducks around irrigation tanks and natural waters. Besides, the Livestock Department should reorganize its work under the animal feeds project, prepare public pasture lands for animal grazing, especially in irrigation areas. These pasture lands will be constantly maintained to ensure proper utilization.

### 6. Forest Protection Project

The purpose is to give protection to the reserved area of about forty million rai; forest resources including wildlife are to be kept free from destruction. The Forestry Department will improve its approach with regard to the operation of protection units to be set up for truly effective protection of forest. Special attention will be given to the protection of national parks, tree plantations, and valuable forests such as pine in Srisaket and Ubol. Within the *planned period, at least fifty protection units will be put into operation.* The performance in this connection is not quite satisfactory at present, improvement is thus called for.

### 7. Forest Improvement Project

Natural forests will be properly maintained and reafforestation will be carried out in places where damages have been caused by destruction, such as the pine forest of Srisaket, which should be preserved as a source of raw material for paper industry. Teak and other valuable trees are to be grown in the watershed area of about 4,000 rai each year, not to mention eucalyptus and other soft-wood trees. National parks will be located in three places in the region; namely, Khoa Yai, Nakorn rajsima; Phu Kra Dung, Loey; and Phu Parn, Sakol Nakorn. Work of improvement and protection will be carried out with such a degree of efficiency as to be consistent with the fact that, valuable natural resources of the country are to be prevented from depletion at any cost. Moreover, two wildlife refuges will be set up at Dong Larn, Khonkaen, and Lam Narai, Chaiyapoom, respectively.

## Community Development, Land Use, and Public Utilities.

### 1. Community Development Project

Work under the new concept of community development as adopted by the National Community Development Committee will be expanded; various fields of work coordinated, community development workers carefully selected and given the same opportunity of carreer advancement as other members of the Civil Service. Community development involves various fields of work, namely, agricultural extension, village health and nutritional development, adult education, vocational training, and other social activities. The community development worker should put recommendations of the experts and extension workers of other ministries into effective practice in the development area under his responsibility. The people's minds will be trained and reoriented so as to allow village leaders to carry on the work successfully. ***Two community development technical assistance centers will be set up at Ubol and Udornthani.*** These centers will provide training and technical facilities for the benefit of people in the community development area. Foreign assistance will be requested for the establishment of these centers.

### 2. Self-Help Land Settlement Project

The purpose is to improve the existing nine self-help land settlements in the Northeast with a view to achieving greater results. The nine settlements combined have a total area of 791,000 rai at their disposal; only 113,640 rai out of this total has so far been allotted to the people for settlement. It is desirable that the area under occupation be extended to satisfy the need of a greater number of people. Three self-help land settlements to be first improved are: Chieng Pin Self-help Land Settlement, Udornthani; Pone Pisai Self-help Land Settlement, Nongkai; and Mukdaharn Self-help Land Settlement, Nakornpanom. ***2,500 more families will be settled on the extended area.*** The settlements to be improved will be provided with necessary facilities such as equipment, roads within the settlement, water for consumption, etc., With regard to agricultural development, demonstration plots will be set up to show the results of research and experiments of the agriculture stations and agricultural improvement units.

## Public Health

### 1. Establishment of Regional Hospital Project

***Three provincial hospitals at Khonkaen, Ubol, and Nakorn Rajsima respectively will be reorganized and granted regional status*** When upgraded, they will have schools of nursing and midwifery, more beds, and can be used as training hospitals for medical graduates during their intership. The purpose is to encourage these graduates to remain in provincial hospitals.

### 2. Contagious Disease Eradication Project

This project involves general health improvement and extension of contagious disease suppression and control operations. A test center for lung diseases will be established at Khonkaen. Leprosy and yaws will be kept under control.

## Education

***Establishment of the Institute for Agriculture and Mechanical Science Project*** This is to establish a high educational institute of university standard. The Insitute will admit those students who have completed pre-university couse for their further study; the courses provided will place emphasis on practical training. The purpose is to enable graduates of the Institute to find employment in private sector. In implementing this project, a survey will have to be first completed and foreign assistance will be requested in the future. A committee charged with the responsibility of making preparations will be set up immediately.

# Section III

## Projects Requiring Foreign Grants and Loans

### 1. Projects Requiring Foreign Grants]

Up to date Thailand has received relatively little foreign grants-in-aid compared to some other receipient countries. A usual misconception to the effect that Thailand is financially secure and can well do without monetary grants has brought about this situation. In actuality the following points are well worth pointing out:

1. The relatively conservative policy of financial authorities in Thailand purports to protect a free economy, a balanced budget, and an active balance of payments. This policy supported by the Government in order to prevent adversities normally associated with the opposites of the aforementioned conditions has resulted in a stable economy for Thailand. The Government is not willing to sacrifice this stability in return for more import commodities, but is willing to shoulder burden incurred through development loans for the sake of rapid development. On the side of grants, they are never accepted for their own sake or with any political precondition, but only for projects for which grants are appropriate; namely, projects with defense value and technical projects particularly in social fields.

2. In the prewar period Thailand had no economic plan. Nothing was known about development requirements. The long-term outlook was absent. Thus, it was difficult for friendly nations to assist Thailand. This defect has been largely remedied through the effect of economic planning.

It is hoped that the Northeast Development Plan will overcome this shortcoming for this region.

The current Government is well prepared to spell out clearly the country's need for grants and to submit projects to loan-granting authorities. Up till now, Thailand has been receiving assistance from the United Stated, the United Nations Special Fund, the Colombo Plan donor countries, and other friendly sources in form of technical assistance. Capital assistance has largely come from the United States.

The Northeastern region possesses special features making it specially qualified for external financing. Means of transport and communication media are strikingly defective. Irrigation, power development health, and education are only partially developed and have a long way to go. The rate of literacy is quite low compared to the other regions. The defense and political vulnerability of the Northeast makes its development an urgent matter.

By virtue of the above reasons the Northeast Development Plan specifies the projects requiring foreign loans and grants. In many cases comprehensive data are already available, while in some cases technical assistance in the form of engineering and feasibility surveys is called for.

The Northeast Development Plan indicates the following procedures to be carried out:

1. Applications for foreign grants and loans concerning the Northeast will be based upon this Northeast Development Plan.

2. Preliminary and comprehensive surveys will be made on these projects before their submittance to relavant foreign agencies such as IBRD and USOM.

3. The projects will be included in the overall National External Financing Plan, 1962 – 1966 with all potential sources of financing listed in line with the consortium principle.

In negotiations for financial assistance the policies and procedures of different sources of finance will be taken into account. For instance, a shift in emphasis from capital grants to development loans on part of the United States and a shift from suppliers' credit to long-term capital assistance on part of the Federal Republic of Germany and Japan are already considered. The Northeast Development Assistance Fund covers grants and assistance loans only. Projects with high commercial value will be applied for conventional sources such as IBRD and the Export-Import Bank.

4. The grant portion is computed at 50 million US dollars in 5 years. Counterpart funds of about 20 per cent will be provided, more if necessary. If this specified amount cannot be acquired, some projects will be shifted to development loans and some dropped out entirely. The success of the Northeast Development Plan will be lessened correspondingly.

Grant projects are divided into two categories; current projects now receiving grants and new projects for the Northeast. They cover three types; technical assistance for projects for which technical expertise and training provisions are made available, feasibility surveys as the prerequisite for loan applications, and supporting assistance for capital projects of paramilitary value. The latter is expected to decline except for the Northeast where the correlation between political, strategic, and economic considerations is high.

## Table 1

### Projects Currently Financed by Grants

### 1961, the Northeast Only

| Project | Objective | Amount by Estimate ( Baht million ) |
|---|---|---|
| **Technical Assistance** | | |
| **Agriculture and Cooperatives** | | |
| ***1. Agricultural Credit and Marketing*** | Improvement of the credit and marketing cooperative systems and operation of the Pak Chong production credit society | 2.7 |
| ***2. Plant Protection*** | Plant disease and pest control | 0.3 |
| ***3. Agronomic Development*** | Training in use of fertilizers, water and soil utilization, and practice of mixed farming | 0.7 |
| ***4. Livestock Development*** | Improvement of Khonkaen and Mahasarakam livestock stations and setting up livestock quarantines | 1.0 |

| Project | Objective | Amount by Estimate (Baht million) |
|---|---|---|
| ***5. Agricultural Resource Use and Conservation*** | Training in water and soil conservation | 1.2 |
| ***6. Agricultural Extension*** | Setting up extension centers at Nakorn Rajsima and Udornthani | 0.4 |
| | | 6.3 |
| **Industry and Power** | | |
| ***1. Mining Development*** | Development of manganese mine at Loey, rock salt and copper at Nakorn Rajsima | 9.5 |
| ***2. Groundwater Exploration*** | Regionwide exploration of groundwater and digging of artesian wells | |
| ***3. Power Service Training*** | Survey of power potentialities in the Northeast | 4.2 |
| | | 13.7 |
| **Community Development** | | |
| ***1, Community Development*** | Area coverage work at Udornthani and Srisaket | 2.8 |
| | | 2.8 |
| **Public Health** | | |
| ***1. Malaria Eradication*** | Control and combat of malaria | |

| Project | Objective | Amount by Estimate ( Baht million ) |
|---|---|---|
| *2. Village Sanitation* | Village health and sanitation work at Nakorn Rajsima | 11.0 |
| | | 11.0 |
| **Education** | | |
| *1. General Education Development* | Improvement of Teachers' Training Schools at Ubol, Udornthani, and Nakorn Rajsima | 0.9 |
| *2. SEATO Skilled Labor Schools* | Setting up vocational schools at Nakorn Rajsima Ubol, Nongkai and Nakorn panom | 5.9 |
| *3. Vocational Education* | Improvement of Nakorn Rajsima Technical College and Surin Agricultural School | |
| | | 6.8 |
| | **Total Technical Assistance** | 40.6 |
| **Defense Support** | | |
| **Transport** | | |
| *1. Bridge Replacement* | Replacement of wooden bridges to concrete bridges | |

| Project | Objective | Amount by Estimate (Baht million) |
|---|---|---|
|  | on routes Udornthani–Nakornpanom, Banpai–Nongkai, Udornthani–Loey, Chaiyapoom – Chumpae | 74.0 |
| ***2. Improvement of Highway*** | Improvement of Korat-Nongkai Highway 414 kilometers in length |  |
| ***3. Airfield Improvement*** | Improvement of airfields at Nakorn Rajsima, Udornthani, and Ubol | 17.9 |
|  | **Total Defense Support** | **91.9** |
|  | **Grand Total** | **132.5** |

All these projects are projects currently receiving assistance from the United States through USOM/Thailand and are expected to continue probably in modified forms. In addition, Thailand has been receiving assistance in non-project forms under the Colombo Plan, regional and special assistance, such as the Lower Mekong Basin Development Scheme (Survey of Pamong Dam site)

The next table lists the projects for which future grants are requested.

## Table 2

**New Projects Requesting Grants**
**1962–1966, the Northeast Only**

| Project | Description | Probable Source of Finance | Value by Estimate (Baht million) |
|---|---|---|---|
| **Technical Assistance** | | | |
| **Agriculture and Cooperatives** | | | |
| ***1. Water Use Training and Pilot Project*** | Demonstration and training in water use in irrigation tank areas | UNSF and Colombo Plan | 5.0 |
| ***2. Forest Inventory*** | Inventory of forest resources | FAO | 0.5 |
| ***3. Lac Research Institute*** | Promotion of and research in lac culture | UNSF and Colombo Plan | 10.0 |
| ***4. Land Cooperatives*** | Setting up of land cooperatives in irrigated arers | USOM | 2.5 |

| Project | Description | Probable Source of Finance | Value by Estimate (Baht million) |
|---|---|---|---|
| ***5. Cotton Promotion*** | Promotion of cotton using improved seeds and ginning methods | Colombo Plan (UK) | 1.0 |
| ***6. Forages and Pasture Development*** | Research, extension, and management of forages and pasture | USOM or Colombo Plan | 1.5 |
| ***7. Livestock Development*** | Experiment and extension in livestock husbandry including dairy husbandry | FAO and Colombo Plan | 2.0 |
| ***8. Castor Beans Promotion*** | Production, disease control, and processing of castor beans | Japan | 0.5 |
| ***9. Agricultural Development in Mekong Tributary Areas*** | Setting up of agricultural stations and Demonstration farms at Kalasin and other areas in connection with the Lower Mekong Development Project | UNSF and friendly nations | 5.0 |
| ***10. Soil Fertility and Survey*** | Studies in soil fertility and | UNSF | 13.0 |

| Project | Description | Probable Source of Finance | Value by Estimate ( Baht million ) |
|---|---|---|---|
| | soil classification | | |
| ***11. Reafforestation*** | Reafforestation of watershed areas | Canada | 10.0 |
| ***12. Inland Fishery Promotion*** | Propagation and distribution of fishing stock, and construction of fish dams | USOM | 5.0 |
| ***13. Irrigation Tank Development*** | Development of Irrigation tanks and canal systems | USOM | 35.0 |
| | | | 91.0 |
| **Industry and Power** | | | |
| ***1. Paperpulp Material Survey*** | Survey of pine forests in the Northeast suitable for newsprint production | UNSF | 4.0 |
| ***2. Industrial Raw Material Survey*** | Survey of industrial raw material and preparation of industrial census | Colombo Plan | 1.5 |

| Project | Description | Probable Source of Finaning | Value by Estimate (Baht million) |
|---|---|---|---|
| ***3. Family Industry Prototype and Designing Center*** | Setting up of a prototype and designing center for family industries | Japan | 3.0 |
| ***4. Industrial Research*** | Research in manufacturing industrial products using local materials | USOM and Colombo Plan | 2.0 |
| ***5. Research in Chemical Industry*** | Setting up a research center to test rock salt properties possible for chemical industry | Friendly nation | 2.2 |
| ***6. Geophysical Survey*** | Aerial mapping of geophysical features of land | USOM | 10.0 |
| ***7. Mineral Survey in Mekong Basin*** | Mineral survey in Loey and Nongkai | UNSF | 5.0 |
| ***8. Comprehensive Survey of Nam Pung Project*** | Comprehensive survey of Nam Pung multiple-purpose project | Japan | 1.7 |
| ***9. Mineral Survey in the Northeast*** | Mineral survey in the North east (except Loey and Nongkai) | USOM | 32.0 |
| | | | 61.4 |

| Project | Description | Probable Source of Finance | Value by Estimate (Baht million) |
|---|---|---|---|
| **Community Development, Land Use, and Public Utilities** | | | |
| ***1. Community Development*** | Setting up community development technical centers | SEATO | 4.6 |
| ***2. Land Classification*** | Aerial photograph, photogrammetry, and cadastral survey | Germany, Switzerland, and other friendly nations | 11.2 |
| ***3. Feeder Road Construction Equipment Centers*** | Setting up two equipment centers for feeder road construction | Australia | 25.0 |
| | | | 40.8 |
| **Public Health** | | | |
| ***1. Eradication of Intestinal Worm Disease*** | Eradication of intestinal worm disease which is widespread in this region | UNICEF and WHO | 2.0 |

| Project | Description | Probable Source of Finance | Value by Estimate (Baht million) |
|---|---|---|---|
| **2. *Rural Health Development*** | Setting up mobile units of ambulances with medical staffs to assist in rural health programs | New Zealand | 2.5 |
| **3. *Hospital Improvement*** | Provision of medical equipment and supplies to provincial hospitals | USOM and Colombo Plan | 30.0 |
|  |  |  | 34.5 |
| **Education** |  |  |  |
| **1. *Technical School at Khonkaen*** | Setting up a technical school at Khonkaen along the line of Northern Bangkok Technical School | Germany | 6.0 |
| **2. *Technical College*** | Setting up a new technical college at Udornthani or Ubol | USOM | 6.0 |

| Project | Description | Probable Source of Finance | Value by Estimate (Baht million) |
|---|---|---|---|
| 3. ***Northeast Institute for Agriculture and Mechanical Science ( A & M )*** | Faculty training, teaching help, and supply of teaching and research equipment | USOM | 50.0 |
| | | | 62.0 |
| | **Total Technical Assistance** | | **289.7** |
| **Pre-investment Surveys** | | | |
| 1. ***Water Resources Development*** | Feasibitily surveys of multiple-purpose and irrigation projects for the purpose of loan application | USOM and New Zealand ( Dome Noi ) | 5.0 |
| 2. ***Highways Construction and Improvement*** | Surveys of potential highway routes or existing routes | IBRD and USOM | 20.0 |
| 3. ***Kaenghoi-Buayai-Mukdaharn Railway*** | Survey of the potential route for the new railroad line | Germany | 10.0 |

| Project | Description | Probable Source of Finance | Value by Estimate (Baht million) |
|---|---|---|---|
| ***4. Feeder Road System*** | Survey of about 2,000 kilometers of feeder roads | IBRD or USOM | 10.0 |
| ***5. Area Development*** | Survey of Khonkaen area development ( Agrimetro ) center | USOM | 5.0 |
|  | **Total Pre-Investment Surveys** |  | **50.0** |
| **Supporting Assistance** |  |  |  |
| ***1. Highways Improvement*** | Improvement of highways with economic and strategic values such as Nakorn Rajsima–Nongkai, Nakornpanom–Ubol, and Nakorn Rajsima–Eastern Seaboard | USOM | 400.0 |
| ***2. Aeronautical Ground Service Improvement*** | Construction and improvement of 4 high-standard airfields and 8 usable airstrips | USOM | 40.0 |

| Project | Description | Probable Source of Finance | Value by Estimate ( Baht million ) |
|---|---|---|---|
| ***3. Communication Media*** | Improvement of communication media including Khonkaen radio and TV station | USOM | 20.0 |
| ***4. Area Development*** | Khonkaen and Sakol Nakorn area development | USOM | 200.0 |
|  | **Total Supporting Assistance.** |  | **660.0** |
|  | **Grand Total** |  | **1,000.0** |

## 2. Projects Requiring External Loans

Northeast development projects to be financed by external loans are infrastructural projects requiring heavy capital outlays. They account for about one-half of the projects included under the National Plan which require capital assistance in the form of loans for the years 1962-1966. Certain projects of public corporations are listed, but in general the Northeast Development Plan will not emphasize the role of public corporations as regards outside capital requirement. Social projects are also not included because they normally require little foreign exchange and are not generally eligible for external loans. It is to be hoped, however, that when foreign exchange is secured for capital projects, it will become possible to allocate a greater share of the national budget for social services. This will not be realized, however, if only the foreign exchange part will be granted as a loan leaving the local currency component to be met in entirety by the national budget. However, the role of supplier's credit is not mentioned, since it is intended that only in extraordinary circumstances will this source of financing be resorted to.

**Two categories of loans are envisaged:**

First, conventional loans are short and medium-term loans at the market rate of interest. Commercial projects and projects with exceptional economic potential will be applied for this type of loans, principally from the World Bank.

The second category is assistance or development loans essentially for long-term projects with little or no direct monetary return to the Government, such as highways and irrigation. Such projects will be submitted to friendly nations including the US, West Germany, and to the International

Development Association, which so far has failed to recognize the need for financial assistance of smaller countries.

The trend in foreign assistance policy is now shifting from grants-in-aid to development loans. This brings with it certain perplexing problems such as the matter of local currency contributions. If not carefully controlled, the new policy is likely to do a lot of damage by spurring an inflationary financial policy on the part of receipient nations anxious to qualify for this type of capital assistance. There are also other problems such as the burden on the balance of payment since repayments of loan must be made in hard currencies, and the restriction placed on the purchase of goods and services. But the most difficult problem remains from where an underdeveloped country can possibly raise this additional local currency requirement.

In the case of Thailand the National Plan has already projected a ten per cent increase in public expenditures annually. This target to be achieved presupposes relatively strong measures of monetary and financial reforms. The additional local currency requirement will jeopardize further the financial stability of the country. Since the Northeast is a special problem area and the danger confronting it is an urgent one and not one to be solved largely by extremely long-term measures such as improvement in education. It is hoped that some projects of paramilitary value will continue to receive supporting assistance, and that some local currency will be granted as part of the loans requested. If this is not favorably considered, the success of the Northeast Development Plan will correspondingly diminish.

**Four categories of projects requiring external loans:**

**1. Water Resources Development**

Two irrigation and five multiple-purpose projects will be submitted to lending agencies after through feasibility surveys. These include projects related to the Mekong Development Project. The Mekong Project itself is, however, a long-term one and will not be included.

| Project | Irrigable Area (rai) | Installed power 1/ capacity KW | Estimated Cost ( Baht million) | Remark |
|---|---|---|---|---|
| 1. Lam Praplerng | 70,000 | 5,000 | 116.6 | DLF loan approved |
| 2. Lam Pao | 100,000 | 15,000 | 121.1 | for projects 1 and 2 |
| 3. Nam Pong | 250,000 | 25,000 | 300.0 | Loan application submitted to Germany |
| 4. Nam Pung | 50,000 | 3,000 | 50.0 | First stage only. |
| 5. Dome Noi | 100,000 | 5,000 | 140.0 | Project now under survey |
| 6. Lam Oon | 100,000 | – | 75.0 | Project to be surveyed |
| 7. Lam Takong 2/ | 30,000 | – | 90.8 | Project now under survey |
| ***Total*** | ***700,000*** | ***35,000*** | ***893.5*** | |

***Remark*** 1/ Including secondary power; only Nam Pong and Nam Pung (Second stage) projects will be constructed for power.

2/ May be replaced by an alternative project if survey result not feasible.

## 2. Power

The distribution system in the Northeast will be set up to cover first about 20 per cent and later about 55 per cent of the population. A thorough study will be taken to see if a thermal plant will be required, otherwise attempts will be made to link the power from projects in the North to the Northeast.

## 3. Transport

### *3.1 Highways*

#### *Highways Improvement*

| Project | Distance (km) | Estimated Cost ( Baht million ) |
|---|---|---|
| 1. Loey-Khonkaen | 208.7 | 140.0 |
| 2. Banpai-Nakornpanom | 299.3 | 130.5 |
| 3. Udornthani-Sakol Nakorn | 160.0 | 83.4 |
| ***Total*** | ***668.0*** | ***353.9*** |

#### *Highways Construction*

| Project | Distance (km) |
|---|---|
| 1. Buachum-Loey | 354.3 |
| 2. Udornthani-Wangsapung | 121.0 |
| 3. Lomsak-Chumpae | 151.0 |
| 4. Chokechai-Dejudom | 339.0 |
| ***Total*** | ***965.3*** |

**The cost of construction is estimated at not less than 1,000 million baht. In addition, 600 kilometers of feeder roads will be constructed at about 300 million baht in cost.**

***3.2 Railways*** The Government has the definite policy to build the railroad from Kaengkoi to Mukdaharn. For the Plan period the Kaengkoi-Buayai section will be built. A loan for this purpose is being sought from Germany totalling approximately 320 million baht.

## 4. Agricultural Credit

The Government has a policy to establish the Bank for Agriculture and Cooperatives to provide short, medium, and long-term production credit to farmers at low rates along with the provision of technical assistance. The Northeast is particularly qualified for low-cost financial assistance. The national budget is, however, limited and the Bank to be created cannot function effectively without sufficient working capital estimated at about 500 million baht at the initial stage. Out of this amount a certain sum will be earmarked for the Northeast only.

## The Amount of Loans Estimated

The costs of construction of the various projects aforementioned are preliminary and provisional estimates pending results of feasibility surveys.

| | | |
|---|---|---|
| 1. Water Resources Development | 894 | Baht million |
| 2. Industry and Power | 300 | |
| 3. Transport | 1,974 | |
| 4. Agricultural Credit | 500 | |
| Total | 3,668 | |

The sources of loans are divided into conventional loans at 70:30 foreign exchange/local currency ratio and development loans at 80:20 ratio for long-term, infrastructural projects. The total local currency contribution is

**provisionally listed at 823 million baht. If, as may well be the case, only the foreign exchange part will be covered by the loans, the number of projects will have to be reduced, lessening the effectiveness of the Northeast Development Plan.**

**On the other hand, if all of the objectives and targets enlisted in the Plan will be achieved, the Northeastern region of Thailand will be turned into an economically developed and politically secure area with promising long-range prospects.**

# APPENDIX

## Statistics on the Northeast

## TABLE

Page

1 Area, Population and Population Density in the Northeast (1960) 1

2 Rice : Area planted, Yield and Production in the Northeast (1961) 2

3 Fishery and Livestock in the Northeast (1960) 3

4 Upland Crops : Area planted and Production in the Northeast (1960) 4–5

5 Forestry : Forestry in the Northeast (1960) 6

6 Potential Storage Dam in the Northeast (Capacity over 100 mill. $m.^3$) 7–8

7 Irrigation in the Northeast (1959) 9

8 Present and Underconstructed Tank Irrigation in the Northeast (1960) 10

9 Cooperative Society in the Northeast (1960) 11–12

10 Proposed Tank Irrigation in the Northeast (1960) (Capacity Over 5 mill. $m.^3$) 13

11 Electric Power in the Northeast (1960) 14–17

12 State Highway in the Northeast (1960) 18–19

13 Feeder Road in the Northeast (1960) 20

14 Land Self-Helf Settlement in the Northeast (1961) 21

15 Public Health Service in the Northeast (1960) 22

16 Local Water–Work in the Northeast, 1961-1966 23

17 Changwad Waterwork in the Northeast, 1961-1966 24

18 Rural Health Development in the Northeast (1960) 25

19 Education in the Northeast (1959) 26

**Table 1 : Area, Population and Population Density in the Northeast (1960)**

| Changwad | Area (sq. Kms) | Population | Population Density (sq. Kms) |
|---|---|---|---|
| 1. Kalasin | 7,650 | 427,483 | 55.9 |
| 2. Khonkaen | 13,404 | 836,621 | 62.4 |
| 3. Chaiyaphum | 10,788 | 474,751 | 44.0 |
| 4. Nakornpanom | 9,749 | 419,812 | 43.1 |
| 5. Nakornrajsima | 19,589 | 1,047,434 | 53.5 |
| 6. Nongkai | 7,222 | 230,216 | 31.9 |
| 7. Burirum | 10,771 | 570,228 | 53.5 |
| 8. Mahasarakarm | 5,760 | 496,970 | 86.3 |
| 9. Roi-et | 7,855 | 662,259 | 84.3 |
| 10. Loëy | 10,936 | 208,277 | 19.0 |
| 11. Srisaket | 8,813 | 599,969 | 68.1 |
| 12. Sakolnakorn | 9,539 | 414,832 | 43.5 |
| 13. Surin | 8,783 | 573,953 | 65.5 |
| 14. Udornthani | 16,605 | 730,525 | 44.0 |
| 15. Ubolrajthani | 22,758 | 1,101,531 | 48.4 |
| Northeast | 170,222 | 8,794,861 | 52.0 |
| Whole country | 514,095 | 25,753,000 | 50.1 |
| Ratio (%) | 33 | 34.15 | – |

## Table 2 : Rice

## Area planted, Yield and Production in the Northeast (1961)

| Changwad | Area planted (rai) | Yield (kg. per rai) | Production (1000 ton) |
|---|---|---|---|
| 1. Kalasin | 852,360 | 202 | 162.73 |
| 2. Khonkaen | 1,050,030 | 195 | 192.65 |
| 3. Chaiyaphum | 631,811 | 217 | 157.478 |
| 4. Nakornpanom | 514,885 | 208 | 100.78 |
| 5. Nakornrajsima | 1,076,665 | 201 | 191.98 |
| 6. Nongkai | 361,095 | 222 | 76.86 |
| 7. Burirum | 728,396 | 155 | 108.45 |
| 8. Mahasarakarm | 613,558 | 151 | 75.94 |
| 9. Roi-et | 1,265,818 | 137 | 145.45 |
| 10. Loey | 127,047 | 345 | 43.49 |
| 11. Srisaket | 1,256,281 | 101 | 123.22 |
| 12. Sakolnakorn | 957,968 | 195 | 172.99 |
| 13. Surin | 1,063,482 | 109 | 116.01 |
| 14. Udornthani | 1,356,485 | 153 | 208.74 |
| 15. Ubolrajthani | 2,916,180 | 137 | 370.07 |
| Northeast | 14,772,061 | 163 | 2,246.87 |
| Whole country | 37,948,245 | 222 | 7,845.40 |

## Table 3 :
## Area Planted and

| Changwad | Maize |  | Jute, Kenaf, Ramie |  | Sugar-cane |  |
|---|---|---|---|---|---|---|
|  | rai | ton | rai | ton | rai | ton |
| 1. Karasin | 35 | 10 | 72 | 15.6 | 15 | 52.2 |
| 2. Khonkaen | 24 | 7 | 78 | 19.6 | 11 | 22.0 |
| 3. Chaiyaphum | 38 | 10 | 92 | 13.6 | 7 | 38.2 |
| 4. Nakornpanom | 23 | 7 | 1 | 0.1 | 0.4 | 4.2 |
| 5. Nakornrajsima | 87 | 31 | 95 | 14.2 | 54 | 298.5 |
| 6. Nongkai | 21 | 5 | 0.2 | 0.1 | 7 | 23.0 |
| 7. Burirum | 36 | 11 | 13 | 2.2 | 18 | 45.3 |
| 8. Mahasarakarm | 30 | 9 | 153 | 31.4 | 2 | 6.0 |
| 9. Roi-et | 21 | 6 | 40 | 9.7 | 2 | 10.4 |
| 10. Loey | 10 | 3 | 1 | 0.2 | 5 | 18.3 |
| 11. Srisaket | 31 | 9 | 83 | 1.7 | 9 | 28.2 |
| 12. Sakolnakorn | 38 | 11 | 8 | 1.5 | 12 | 38.2 |
| 13. Surin | 28 | 9 | 0.4 | 0.1 | 15 | 29.0 |
| 14. Udornthani | 39 | 12 | 2 | 0.6 | 114 | 459.5 |
| 15. Ubolrajthani | 43 | 13 | 218 | 52.4 | 9 | 61.0 |
| Northeast | 504 | 153 | 857 | 179.8 | 280.4 | 1,134.0 |
| Whole country | 1,785 | 544 | 907 | 199.0 | 986 | 5,382.3 |
| Ratio (%) | 28 | 28 | 94 | 90 | 28 | 21 |

**Upland Crops**

**Production in the Northeast (1960)**

(In thousand)

| Beans | | Cotton | | Tobacco | | Kapok, Bombax | |
|---|---|---|---|---|---|---|---|
| rai | ton | rai | ton | rai | ton | rai | ton |
| 6 | 1.1 | 4 | 0.4 | 14 | 1.9 | 3 | 5.6 |
| 25 | 5.1 | 7 | 1.3 | 9 | 2.3 | 4 | 4.5 |
| 15 | 3.1 | 17 | 2.6 | 6 | 1.6 | 8 | 9.4 |
| 5 | 1.2 | 4 | 0.4 | 11 | 2.7 | 0.5 | 0.2 |
| 60 | 12 | 11 | 1.7 | 10 | 1.9 | 31 | 45.0 |
| 9 | 1.4 | 2 | 0.4 | 7 | 1.7 | 4 | 1.9 |
| 25 | 5.3 | 8 | 1.3 | 9 | 1.1 | 0.2 | 0.2 |
| 20 | 4.1 | 20 | 2.1 | 10 | 2.2 | 25 | 22.4 |
| 5 | 1.1 | 4 | 0.5 | 4 | 0.6 | 5 | 6.0 |
| 13 | 2.0 | 71 | 9.6 | 7 | 1.0 | 1 | 0.8 |
| 9 | 1.1 | 5 | 0.7 | 9 | 0.9 | 11 | 13.3 |
| 3 | 0.6 | 5 | 0.9 | 2 | 0.2 | 1 | 1.7 |
| 8 | 1.6 | 3 | 0.4 | 10 | 1.2 | 2 | 2.2 |
| 35 | 6.2 | 14 | 2.1 | 4 | 0.7 | 7 | 2.0 |
| 28 | 5.0 | 9 | 1.3 | 8 | 1.6 | 10 | 7.3 |
| 266 | 50.9 | 184 | 25.7 | 120 | 21.6 | 112.7 | 122.5 |
| 1,201 | 237.9 | 347 | 45.0 | 367 | 74.0 | 365 | 407.0 |
| 22 | 21 | 53 | 57 | 33 | 29 | 31 | 30 |

### Table 4: Fishery and Livestock in the Northeast ( 1960 )

| Changwad | Fishery | | Livestock ( In thousand ) | | | |
|---|---|---|---|---|---|---|
| | Swamp Land (rai) | Number of landing (ton) | Cattle | Buffaloes | Swine | Poultry |
| 1. Karasin | 33 | 0.4 | 97 | 152 | 82 | 561 |
| 2. Khonkaen | 43 | 0.2 | 187 | 248 | 125 | 260 |
| 3. Chaiyaphum | 15 | 0.6 | 184 | 249 | 45 | 289 |
| 4. Nakornpanom | 4 | 1.9 | 159 | 265 | 32 | 479 |
| 5. Nakornrajsima | 22 | 1.0 | 264 | 255 | 139 | 708 |
| 6. Nongkai | 34 | 2.0 | 67 | 172 | 31 | 58 |
| 7. Burirum | 3 | 1.7 | 194 | 186 | 84 | 20 |
| 8. Mahasarakarm | 29 | 0.2 | 173 | 204 | 60 | 2,500 |
| 9. Roi-et | 25 | 18.6 | 103 | 186 | 67 | 2,162 |
| 10. Loey | 1 | – | 18 | 56 | 30 | 447 |
| 11. Srisaket | – | 0.1 | 126 | 147 | 29 | 34 |
| 12. Sakolnakorn | 84 | 1.6 | 194 | 216 | 65 | 100 |
| 13. Surin | – | 1.2 | 189 | 166 | 53 | 132 |
| 14. Udornthani | 59 | 0.9 | 126 | 179 | 112 | 3,821 |
| 15. Ubolrajthani | 42 | 3.8 | 174 | 262 | 210 | 2,098 |
| Total | 394 | 34.2 | 2,255 | 2,943 | 1,164 | 13,669 |

## Table 5 : Forestry

## Forestry in the Northeast ( 1960 )

| Changwad | Total Area ( rai ) | Forest Area ( rai ) | Proposed Forest Reserve ( rai ) | Present Forest Reserve ( rai ) | Present Forest Protection ( rai ) | Underreserved Forest ( rai ) | Underprotected Forest ( rai ) | Forest Production ( m.$^3$) |
|---|---|---|---|---|---|---|---|---|
| 1. Karasin | 4,781,000 | 865,321 | 2,093,750 | 226,719 1/ | 30,937 | 890,275 | 12,550 | 32,937 |
| 2. Khonkaen | 8,378,000 | 3,269,950 | 5,188,125 | – | 62,500 | 1,367,331 | – | 37,620 |
| 3. Chaiyaphum | 6,742,000 | 3,457,181 | 1,885,625 | – | 462,500 | 1,382,806 | – | 40,587 |
| 4. Nakornpanom | 6,093,000 | 3,166,825 | 2,395,000 | – | 625,000 | 531,512 | 1,173,437 | 20,568 |
| 5. Nakornrajsima | 12,244,000 | 6,247,131 | 7,946,250 | – | 702,969 1/ | 4,598,750 | – | 91,865 |
| 6. Nongkai | 6,732,000 | 2,336,300 | 4,046,250 | 631,250 1/ | 215,625 1/ | 96,906 | 820,000 | 183,986 |
| 7. Burirum | 3,630,000 | 273,062 | 3,766,875 | – | – | 359,737 | – | 7,188 |
| 8. Mahasarakarm | 4,910,000 | 932,500 | 1,241,875 | – | 307,500 1/ | – | 231,250 | 4,809 |
| 9. Roi-et | 6,835,000 | 5,270,706 | 1,978,125 | 217,581 | 781,250 | 168,750 | 446,875 | 15,060 |
| 10. Loey | 5,962,000 | 3,388,800 | 2,212,500 | – | 1,130,625 | – | – | 21,269 |
| 11. Srisaket | 5,508,000 | 1,135,625 | – | – | 50 | 720,000 | 112,500 | 13,693 |
| 12. Sakolnakorn | 5,490,000 | 2,336,875 | 2,203,750 | – | 610,000 | 90,794 | 108,487 | 54,926 |
| 13. Surin | 4,514,000 | 2,029,375 | – | – | – | 112,518 | 698,125 | 29,465 |
| 14. Udornthani | 10,378,000 | 4,292,181 | 5,296,250 | – | 732,500 | 1,517,181 | 1,434,375 | 105,098 |
| 15. Ubolrajthani | 14,224,000 | 3,458,975 | 10,538,125 | – | – | 187,100 | 34,375 | 34,473 |
| Total | 106,421,000 | 42,460,807 | 50,903,500 | 1,075,550 | 5,661,456 | 12,023,660 | 5,071,974 | 691,644 |

**Note : 1/ Figure in 1961**

**Table 6 :**
**( Capacity over**

| Project | Flow into River | Location of Damsite | | |
|---|---|---|---|---|
| | | Village | Amphur | Changwad |
| 1. Lam Pao | Chee | Nakoe | Sahadsakhan | Kalasin |
| 2. Nam Pong | Chee | Pongneep | Lam Pong | Khonkaen |
| 3. Nam Chee (uper) | Chee | Kangthadur | Muang | Chaiyaphum |
| 4. Huay Sai | Mekong | Kumhark | Tha-Uthen | Nakornpanom |
| 5. Huay Yang Sai | Mekong | Nadum | Nakae | Nakornpanom |
| 6. Lam Pra Plerng | Mul | Buhuachang | Pukthongchai | Nakornrajsima |
| 7. Lam Takong | Mul | Parkchongnoi | Parkchong | Nakornrajsima |
| 8. Nam Mul (uper) | Mekong | ( Between Valley) | Chok-chai | Nakornrajsima |
| 9. Huay He | Songkram | Sekanakum | Bungkarn | Nongkai |
| 10. Nam Young | Chee | Tardkutnamsai | Pon-thong | Roi-et |
| 11. Huay Kayung | Mul | Kum | Karn-tha-Luk | Srisaket |
| 12. Nam Oun | Songkram | Nongbua | Varich-phum | Sakolnakorn |
| 13. Nam Pung | Nam Gum | (Between Valley) | Muang | Sakolnakorn |
| 14. Nam Mong | Mekong | Na-Oung | Banphue | Udorn |
| 15. Dom Yai | Mul | Thaposri | Dej-udom | Ubol |
| 16. Dom Noi | Mul | Parknokkraten | Dej-udom | Ubol |
| Total | | | | |

**Potential Storage Dam in the Northeast**
**100 mill. m.$^3$)**

| Watershed Area (km.$^2$) | Total Rainfall (mm.$^3$) | Capacity (mill. m.$^3$) | Irrigable Area (rai) |
|---:|---:|---:|---:|
| 3,870 | 1,244 | 500 | 10,000 |
| 11,350 | 1,135 | 1,800 | 200,000 |
| 1,700 | 1,100 | 470 | 190,000 |
| 6,700 | 2,139 | 630 | 60,000 |
| 1,350 | 1,483 | 700 | 80,000 |
| 833 | 1,250 | 207 | 52,400 |
| 1,050 | 760 | 145 | 60,000 |
| 500 | 997 | 110 | 40,000 |
| 515 | 2,322 | 560 | 95,000 |
| 920 | 1,763 | 600 | 200,000 |
| 696 | 1,266 | 240 | 57,000 |
| 1,100 | 1,210 | 360 | 140,000 |
| 570 | 1,712 | 545 | 80,000 |
| 895 | 1,335 | 350 | 80,000 |
| 3,190 | 1,481 | 1,510 | 100,000 |
| 1,643 | 1,231 | 545 | 80,000 |
| 36,800 | 22,428 | 9,222 | 1,742,400 |

## Table 7 : Irrigation in the Northeast (1959)

| Changwad | Total Land | Irrigable Area | Irrigable Area<br>State Irrigable Area | <br>People's Irrigable Area | <br>Tank Irrigable Area |
|---|---|---|---|---|---|
| 1. Kalasin | 3,947,500 | 26,925 | – | 5,000 | 21,925 |
| 2. Khonkaen | 8,630,625 | 19,400 | – | 3,000 | 16,400 |
| 3. Chaiyaphum | 6,065,625 | 698 | – | – | 698 |
| 4. Nakornpanom | 6,066,250 | 24,408 | – | – | 24,408 |
| 5. Nakornrajsima | 12,741,250 | 277,000 | 253,000 | 7,500 | 16,500 |
| 6. Nongkai | 4,705,000 | 72,720 | 64,000 | – | 8,720 |
| 7. Burirum | 6,001,875 | 18,050 | – | – | 18,050 |
| 8. Mahasarakarm | 5,605,000 | 74,208 | 29,000 | – | 45,208 |
| 9. Roi-et | 3,948,750 | 205,100 | 180,000 | – | 25,100 |
| 10. Loey | 7,032,500 | 14,270 | 5,500 | – | 8,770 |
| 11. Srisaket | 5,575,000 | 11,610 | – | – | 11,610 |
| 12. Sakolnakorn | 6,414,375 | 32,827 | 20,000 | – | 12,827 |
| 13. Surin | 5,755,625 | 56,860 | 46,200 | – | 10,660 |
| 14. Udornthani | 7,443,125 | 53,777 | 40,000 | – | 13,777 |
| 15. Ubolrajthani | 14,482,500 | 20,690 | – | – | 20,690 |
| Northeast | 104,415,000 | 908,543 | 637,700 | 15,500 | 255,343 |

### Table 8 : Present and Underconstructed Tank Irrigation in the Northeast (1960)

( Capacity over 5 mill.m.$^3$ )

| Tank | Location of Tank | | Capacity (mill.m.$^3$) | Irrigable Area (rai) |
|---|---|---|---|---|
| | Amphur | Changwad | | |
| 1. Huaybangpuen 1/ | Thabor | Nongkai | 10.0 | 6,000 |
| 2. Kudlinygor 1/ | Muang | Udornthani | 5.4 | 7,000 |
| 3. Nongyard | Muang | Nakornpanom | 6.7 | 4,950 |
| 4. Huaysithon | Muang | Kalasin | 5.8 | 11,000 |
| 5. Huaylang (uper ) | Chaturaphak | Roi-et | 5.0 | 3,700 |
| 6. Kanglerngjarn 2/ | Muang | Mahasarakarm | 6.0 | 3,600 |
| 7. Huaychiengkam | Borabue | ” | 5.0 | 3,200 |
| 8. Huaysompoi 1/ | Chaturas | Chaiyaphum | 7.6 | 5,000 |
| 9. Bungkratone 2/ | Buayai | Nakornrajsima | 7.6 | 2,900 |
| 10. Huaybanyang | Muang | ” | 5.9 | 2,800 |
| 11. Huay-yang 2/ | Parkthongchai | ” | 5.5 | 3,400 |
| 12. Huaytalard | Muang | Burirum | 19.1 | 14,000 |
| 13. Lampork 1/ | Srikoraphum | Surin | 13.2 | 8,500 |
| 14. Huaypo | Amnajjalern | Ubolrajthani | 5.3 | 6,830 |
| 15. Huaypladak 1/ | ” | ” | 15.3 | 16,000 |
| 16. Nongchangyai 1/ | Maungsamsib | ” | 7.6 | 7,500 |
| Tatal | – | – | 131.0 | 106,980 |

Note : 1/ Underconstruction
2/ There are Land Improvement Cooperatives

## Table 9 : Cooperative Society

| Changwad | Department of Cooperative Credit | | | Department of | |
|---|---|---|---|---|---|
| | Credit | Production Credit | Savings | Rice | Crop Production |
| 1. Karasin | 171 | – | 1 | 1 | – |
| 2. Khonkaen | 327 | – | 1 | 3 | – |
| 3. Chaiyaphum | 107 | – | 1 | 1 | 1 |
| 4. Nakornpanom | 406 | – | 1 | 2 | – |
| 5. Nakornrajsima (1) | 578 | 1 | 1 | 9 | 1 |
| 6. Nongkai | 95 | – | – | – | – |
| 7. Burirum | 155 | – | – | 2 | – |
| 8. Mahasarakarm | 204 | – | – | 1 | – |
| 9. Roi-et | 327 | – | 1 | 3 | – |
| 10. Loey | 2 | – | 1 | – | 1 |
| 11. Srisaket | 134 | – | 1 | 3 | – |
| 12. Sakolnakorn | 311 | – | 1 | 3 | – |
| 13. Surin (1) | 198 | – | 1 | 2 | – |
| 14. Udornthani | 291 | – | 1 | 4 | – |
| 15. Ubolrajthani (1) | 379 | – | – | 4 | – |
| **Total** | 3,707 | 1 | 11 | 34 | 3 |

**Note** : (1) Including a Federal Cooperatives Society in the Northeast ( 1960 )

| Commercial Co - operation | | | Dep. of Land Co-op. | Total | |
|---|---|---|---|---|---|
| Livestock | Industry | Store | Land Improvememt Co-op. | Society | Member |
| – | – | – | 3 | 176 | 5,898 |
| – | – | 3 | 2 | 336 | 11,810 |
| – | – | – | 2 | 112 | 6,775 |
| – | – | 3 | 2 | 414 | 14,724 |
| 2 | 1 | 8 | 3 | 608 | 29,257 |
| – | – | 2 | 1 | 98 | 2,537 |
| – | – | 2 | 3 | 162 | 6,537 |
| – | – | 2 | 4 | 211 | 6,474 |
| 1 | – | 5 | 4 | 341 | 14,589 |
| – | – | 1 | 2 | 29 | 1,820 |
| – | – | 1 | 4 | 143 | 7,347 |
| – | – | 1 | 2 | 318 | 10,531 |
| 1 | – | 1 | 4 | 207 | 9,292 |
| 3 | – | 6 | 3 | [illegible]8 | 11,815 |
| 1 | – | 2 | 3 | 389 | 14,677 |
| 8 | 1 | 37 | 42 | 3,848 | 154,083 |

**Table 10 : Proposed Tank Irrigation in the Northeast (1960) (Capacity Over 5 mill. m.$^3$)**

| Tank | Location of Tank | | Capacity (mill.m.$^3$) | Irrigable Area (rai) | Cost Construction (mill. baht) | Year Complete* |
|---|---|---|---|---|---|---|
| | Amphur | Changwad | | | | |
| 1. Huaythuan | Thabor | Nongkai | 43.7 | 24,000 | 9.66 | – |
| 2. Huayhinlard | Muang | Udornthani | 7.0 | 7,000 | 3.28 | 2508 |
| 3. Huaysumpard | Kumpawapi | " | 20.0 | 10,000 | 4.40 | – |
| 4. Huaykongsi | " | " | 24.0 | 12,000 | 5.48 | – |
| 5. Huaynambor | Muang | Skolnakorn | 7.0 | 9,000 | 3.56 | 2506 |
| 6. Huaykanluang | Swangdandin | " | 8.6 | 8,000 | 3.32 | – |
| 7. Huaykilake | Mukdaharn | Nakornpanom | 27.0 | 15,000 | 6.10 | – |
| 8. Huaykang | Muang | Karasin | 6.0 | 12,000 | 3.40 | – |
| 9. Huaysaiyai | Sahasakan | " | 10.0 | 6,500 | 2.26 | – |
| 10. Huay–ang | Muang | Roi-et | 15.3 | 12,000 | 4.98 | – |
| 11. Huayjarn | Kasetwisai | " | 5.0 | 4,000 | 2.86 | 2506 |
| 12. Lamchamurk | Pimai | Nakornrajsima | 24.0 | 17,000 | 4.68 | 2506 |
| 13. Huayhinlub | Sikue | " | 11.7 | 8,000 | 3.12 | 2508 |
| 14. Lamsamlai | Soongnern | " | 23.3 | 12,800 | 5.02 | – |
| 15. Huayjorakemark | Muang | Burirum | 21.3 | 12,500 | 3.50 | 2509 |
| 16. Ponyang | Muang | Srisaket | 12.0 | 7,000 | 1.70 | 2506 |
| 17. Huaytaphang | Kukan | " | 18.8 | 10,000 | 5.00 | – |
| 18. Lamtuen | Yasothorn | Ubolrajthani | 14.4 | 12,000 | 3.28 | 2509 |
| 19. Bangdoey | Kemaraj | " | 20.0 | 20,000 | 6.80 | – |
| Total | – | – | 319.1 | 218,800 | 82.40 | – |

**Note :** * Projects are changable due to priority

### Table 11 : Electric Power in the Northeast (1960)

| Changwad and Amphur | Distributor | Capacity (KW) | Peak Load (KW) | Unit Cost (baht) | Unit Sale (KWh) |
|---|---|---|---|---|---|
| ***Kalasin*** | | | | | |
| Muang | Municipality | 110 | 53 | 2.00 | 132,000 |
| Kamalasai | PEA | – | – | – | – |
| Kuchinarai | ” | – | – | – | – |
| Yangtalad | ” | – | – | – | – |
| Sahadsakhan | ” | – | – | – | – |
| ***Khonkaen*** | | | | | |
| Muang | PEA | 587 | 276 | 2.00 | 628,000 |
| Phol (2) | ” | 110 | 70 | 2.00 | 94,500 |
| Nampong (2) | ” | 50 | 16 | 2.00 | 17,400 |
| Chumphae (1) | Private | 60 | 50 | 3.00 | 42,680 |
| Banphai (2) | ” | 110 | 74 | 2.00 | 153,000 |
| Phu-wieng | ” | 50 | 20 | 2.00 | 31,800 |
| ***Chaiyaphum*** | | | | | |
| Muang | PEA | 110 | 76 | 2.00 | 116,700 |
| Phu-khiew | ” | 50 | 21 | 2.00 | 23,800 |
| Chaturas | ” | 50 | 18 | 2.00 | 16,600 |
| ***Nakornpanom*** | | | | | |
| Muang | PEA | 170 | 130 | 2.00 | 237,500 |
| Mukdaharn | ” | 110 | 96 | 2.00 | 99,250 |
| Tha-uten | ” | 110 | 13 | 2.00 | 14,000 |
| Thatpanom | ” | 110 | 32 | 2.00 | 35,400 |

| Changwad and Amphur | Distributor | Capacity (KW) | Peak Load (KW) | Unit Cost (baht) | Unit Sale (KWh) |
|---|---|---|---|---|---|
| ***Nakornrajsima*** | | | | | |
| Muang | PEA | 1,612 | 1,350 | 1.95 | 2,650,000 |
| Pakthongchai | ” | 110 | 29 | 2.00 | 31,000 |
| Noansoong | ” | 110 | 15 | 2.00 | 16,700 |
| Soongnern | ” | 110 | 34 | 2.00 | 36,000 |
| Pimai | ” | 110 | 20 | 2.00 | 21,900 |
| Sikew (2) | ” | 110 | 46 | 2.00 | 45,400 |
| Noanthai (2) | Paivate | 24 | 10 | 0.50 | 12,980 |
| Buayai (2) | ” | 92 | 90 | 2.50 | 82,800 |
| ***Nongkai*** | | | | | |
| Muang | PEA | 656 | 290 | 2.00 | 474,000 |
| Poanpisai | ” | 50 | 24 | 2.00 | 20,700 |
| Thabor | ” | 110 | 46 | 2.00 | 79,500 |
| ***Buriram*** | | | | | |
| Muang | PEA | 250 | 105 | 2.00 | 154,000 |
| Lamplaimas | ” | 110 | 48 | 2.00 | 48,500 |
| Nangrong | ” | 55 | 15 | 2.00 | 20,200 |
| Puthaisong | ” | 50 | 10 | 2.00 | 13,200 |
| Prakoanchai | ” | 55 | 20 | 2.00 | 14,200 |
| ***Mahasarakarm*** | | | | | |
| Muang (1) | Municipality | 170 | 38 | 2.00 | 171,500 |
| Kosumpisai (2) | PEA | 50 | 19 | 2.00 | 16,600 |
| Borabue (2) | ” | 50 | 16 | 2.00 | 15,700 |
| Wapee–pathum (2) | ” | 50 | 17 | 2.00 | 15,500 |
| ***Roi-et*** | | | | | |
| Muang (1) | Municipality | 357 | 90 | 2.00 | 175,208 |

| Changwad and Amphur | Distributor | Capacity (KW) | Peak Load (KW) | Unit Cost (baht) | Unit Sale (KWh) |
|---|---|---|---|---|---|
| Selaphum (2) | PEA | 50 | 38 | 2.00 | 13,200 |
| Suwanphum (2) | „ | 110 | 13 | 2.00 | 11,900 |
| Kasetwisai (2) | „ | 110 | 11 | 2.00 | 9,100 |
| ***Loey*** | | | | | |
| Muang | PEA | 130 | 70 | 2.00 | 105,000 |
| Chienkarn | „ | 50 | 42 | 2.00 | 23,800 |
| ***Srisaket*** | | | | | |
| Muang | PEA | 225 | 95 | 2.00 | 209,000 |
| Kanthrarom | „ | 50 | 16 | 2.00 | 11,700 |
| Kanthaluk | „ | 50 | 14 | 2.00 | 9,100 |
| Rasislai | „ | 55 | 12 | 2.00 | 8,400 |
| Khukhan | „ | 50 | 20 | 2.00 | 12,700 |
| Uthumpornpisai | „ | 110 | 16 | 2.00 | 26,700 |
| ***Sakolnakorn*** | | | | | |
| Muang | PEA | 244 | 150 | 2.00 | 164,000 |
| Pannanikom | „ | 50 | 10 | 2.00 | 6,375 |
| Sawangdandin | „ | 110 | 39 | 2.00 | 25,200 |
| ***Surin*** | | | | | |
| Muang | PEA | 400 | 220 | 2.00 | 343,000 |
| Thatum | „ | 110 | 8 | 2.00 | 7,350 |
| Srikhoraphum | „ | 110 | 36 | 2.00 | 27,600 |
| Ratanaburi | „ | 110 | 11 | 2.00 | 11,800 |
| ***Udornthani*** | | | | | |
| Muang | PEA | 696 | 556 | 2.00 | 1,105,000 |
| Kumphawapee | „ | 150 | 15 | 2.00 | 23,800 |

| Changwad and Amphur | Distributor | Capacity (KW) | Peak Load (KW) | Unit Cost (baht) | Unit Sale (KWh) |
|---|---|---|---|---|---|
| Nongharn | PEA | 50 | 18 | 2.00 | 17,800 |
| Banphue | ” | 110 | 14 | 2.00 | 14,000 |
| Nongbualampu | ” | 110 | 30 | 2.00 | 45,700 |
| ***Ubolrajthani*** | | | | | |
| Muang | PEA | 1,212 | 435 | 2.00 | 1,265,000 |
| Yasothorn (1) | Municipality | 170 | 60 | 2.00 | 29,800 |
| Umnajjalern | PEA | 110 | 30 | 2.00 | 30,200 |
| Kemraj | ” | 110 | 15 | 2.00 | 12,500 |
| Warinchamrab | ” | 225 | 95 | 2.00 | 156,000 |
| Pibulmongsaharn | ” | 110 | 50 | 2.00 | 34,000 |
| Total | | 11,255 | – | – | 9,517,943 |

Note : (1) : 1958
(2) : 1959
PEA : Provincial Electricity Authority

## Table 12 : State Highway in the Northeast ( 1960 )

| No. | Distance | Quality | | |
|---|---|---|---|---|
| | | Asphalt | Rock | Laterite |
| 1. Saraburi - Nakornrajsima - Banpai - Khonkaen - Udorn - Nongkai | 403 | 107 | – | 296 |
| 2. Sikew - Chaiyaphum - Phukiew - Chumpae | 154 | – | – | 154 |
| 3. Nakornrajsima - Pakthongchai - Kabilburi | 64 | – | – | 64 |
| 4. Nakornrajsima - Chokchai | 27 | – | – | 27 |
| 5. Chaiyaphum - Buayai - Taladsai | 85 | 12 | – | 73 |
| 6. Khonkaen - Loey - Chiengkarn | 257 | 4 | – | 253 |
| 7. Udorn - Nongbualamphu | 33 | 14 | – | 19 |
| 8. Nongkai - Thabor - Srichiengmai | 30 | 1 | – | 29 |
| 9. Udorn - Sakolnakorn - Nakornpanom | 240 | 7 | – | 233 |
| 10. Sakolnakorn - Kalasin - Mahasarakarm | 165 | 5 | – | 160 |
| 11. Manjakiri - Banpai - Ubol | 302 | 35 | – | 267 |
| 12. Roi-et - Surin - Chongjom | 182 | – | – | 182 |
| 13. Burirum - Satuk | 7 | – | 7 | – |
| 14. Burirum - Narong | 30 | – | 30 | – |
| 15. Burirum - Prakonchai | 18 | – | 18 | – |
| 16. Chokchai - Dejudom | 27 | – | 27 | – |

| No. | Distance | Quality | | |
|---|---|---|---|---|
| | | Asphalt | Rock | Laterite |
| 17. Yasothorn - Kemaraj | 124 | – | – | 124 |
| 18. Ubol - Pibulmongsaharn - Chongmak | 73 | – | – | 73 |
| 19. Warin - Dej- udom | 42 | 3 | – | 39 |
| 20. Ubol - Umnajjalern - Mukdaharn - Nakornpanom | 268 | 41 | – | 227 |
| 21. Thadpanom - Sakolnakorn | 67 | – | – | 67 |
| 22. Nakornpanom - Tha-uthen | 26 | – | – | 26 |
| 23. Srisaket - Kanthraluk - Kaoprawiharn | 55 | – | – | 55 |
| Northeast | 2,676 | 229 | 82 | 2,368 |
| Whole Country | 8,176 | 2,781 | 5,395 | |
| Ratio (%) | 33 | 8.23 | 45.41 | |

## Table 13 : Feeder Road in the Northeast (1960)

( km. )

| Changwad | No. | Distance | Quality | |
|---|---|---|---|---|
| | | | Rock | Laterite |
| 1. Kalasin | 6 | 106 | 87 | 19 |
| 2. Khonkaen | 3 | 104 | 49 | 55 |
| 3. Chaiyaphum | 5 | 105 | 74 | 31 |
| 4. Nakornpanom | 6 | 215 | 163 | 52 |
| 5. Nakornrajsima | 5 | 87 | 19 | 68 |
| 6. Nongkai | 2 | 85 | 67 | 18 |
| 8. Mahasarakarm | 4 | 157 | 132 | 25 |
| 7. Burirum | 2 | 89 | 46 | 43 |
| 9. Roi-et | 6 | 198 | 142 | 56 |
| 10. Loey | 6 | 40 | 32 | 8 |
| 11. Srisaket | 5 | 184 | 122 | 62 |
| 12. Sakolnakorn | 4 | 88 | 32 | 56 |
| 13. Surin | 6 | 185 | 156 | 29 |
| 14. Udornthani | 5 | 82 | 14 | 68 |
| 15. Ubolrajthani | 5 | 101 | 83 | 18 |
| Total | 70 | 1,826 | 1,218 | 608 |

### Table 14 : Land Self-Help Settlement in the Northeast (1961)

| Lacation | | Begin (year) | Future Action | | Past Performance (1960) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Area Reserve (rai) | Family | Land Allocation (rai) | Land Use (rai) | Family | Popula-tion |
| 1. Chiengpin | Udorn | 1955 | 105,000 | 4,000 | 16,750 | 15,995 | 670 | 3,999 |
| 2. Ponpisai | Nongkai | 1955 | 157,000 | 4,800 | 25,900 | 7,180 | 911 | 4,561 |
| 3. Mukdaharn | Nakornpanom | 1956 | 50,000 | 1,600 | 16,503 | 5,630 | 627 | 2,384 |
| 4. Pimai | Nakornrajsima | 1957 | 30,000 | 1,200 | 28,200 | 10,200 | 1,128 | 6,204 |
| 5. Pruyai | Srisaket | 1957 | 20,000 | 800 | 6,725 | 2,987 | 268 | 1,307 |
| 6. Huaykla | Srisaket | 1957 | 16,400 | 500 | 3,312 | 660 | 136 | 687 |
| 7. Huaytabtan | Surin | 1957 | 32,000 | 1,200 | 4,750 | 1,850 | 190 | 1,039 |
| 8. Prasart | Surin | 1958 | 245,000 | 8,000 | 7,025 | 4,500 | 280 | 1,851 |
| 9. Bangruad | Burirum | 1959 | 136,500 | 4,000 | 4,475 | 334 | 179 | 984 |
| 10. Dongprawat | (Hill–tripe) Loey | 1962 | 50,000 | 219 | – | – | – | – |
| Total | | – | 841,900 | 26,319 | 113,640 | 49,336 | 4,389 | 22,916 |

### Table 15 : Public Health Service in the Northeast (1960)

| Changwad | Clinic Station | | Nursing Home | Inspector | Assistance Nurse | Nurse | | Public Health Nurse |
|---|---|---|---|---|---|---|---|---|
| | First Class | Third Class | | | | Present | Proposed (1961) | |
| 1. Kalasin | – | 9 | 6 | – | 3 | 16 | – | – |
| 2. Khonkaen | 1 | 16 | 6 | 1 | 2 | 25 | 2 | 1 |
| 3. Chaiyaphum | 1 | 9 | 9 | 1 | 1 | 17 | 9 | 1 |
| 4. Nakornpanom | 1 | 7 | 10 | 1 | 3 | 17 | 3 | 1 |
| 5. Nakornrajsima | 2 | 15 | 11 | 2 | 3 | 29 | 6 | 1 |
| 6. Nongkai | 3 | 4 | 9 | – | 4 | 14 | 1 | – |
| 7. Burirum | 2 | 10 | 9 | 1 | 3 | 22 | – | – |
| 8. Mahasarakarm | 1 | 12 | 6 | – | 3 | 19 | 1 | – |
| 9. Roi–et | 1 | 17 | 8 | – | 3 | 24 | 2 | – |
| 10. Loey | 1 | 5 | 13 | – | 3 | 21 | 4 | – |
| 11. Srisaket | 1 | 6 | 12 | – | 3 | 20 | 1 | – |
| 12. Skolnakorn | 1 | 4 | 12 | 1 | 3 | 17 | – | – |
| 13. Surin | – | 10 | 13 | 1 | 4 | 24 | 1 | – |
| 14. Udornthani | 1 | 10 | 9 | – | 4 | 18 | – | – |
| 15. Ubolrajthani | 3 | 21 | 19 | 1 | 7 | 43 | 17 | 1 |
| Total | 19 | 155 | 152 | 9 | 49 | 326 | 47 | |

**Note** : There is a Provincial Hospital in each Changwad

### Table 16 : Local Waterwork in the Northeast, 1961 - 1966

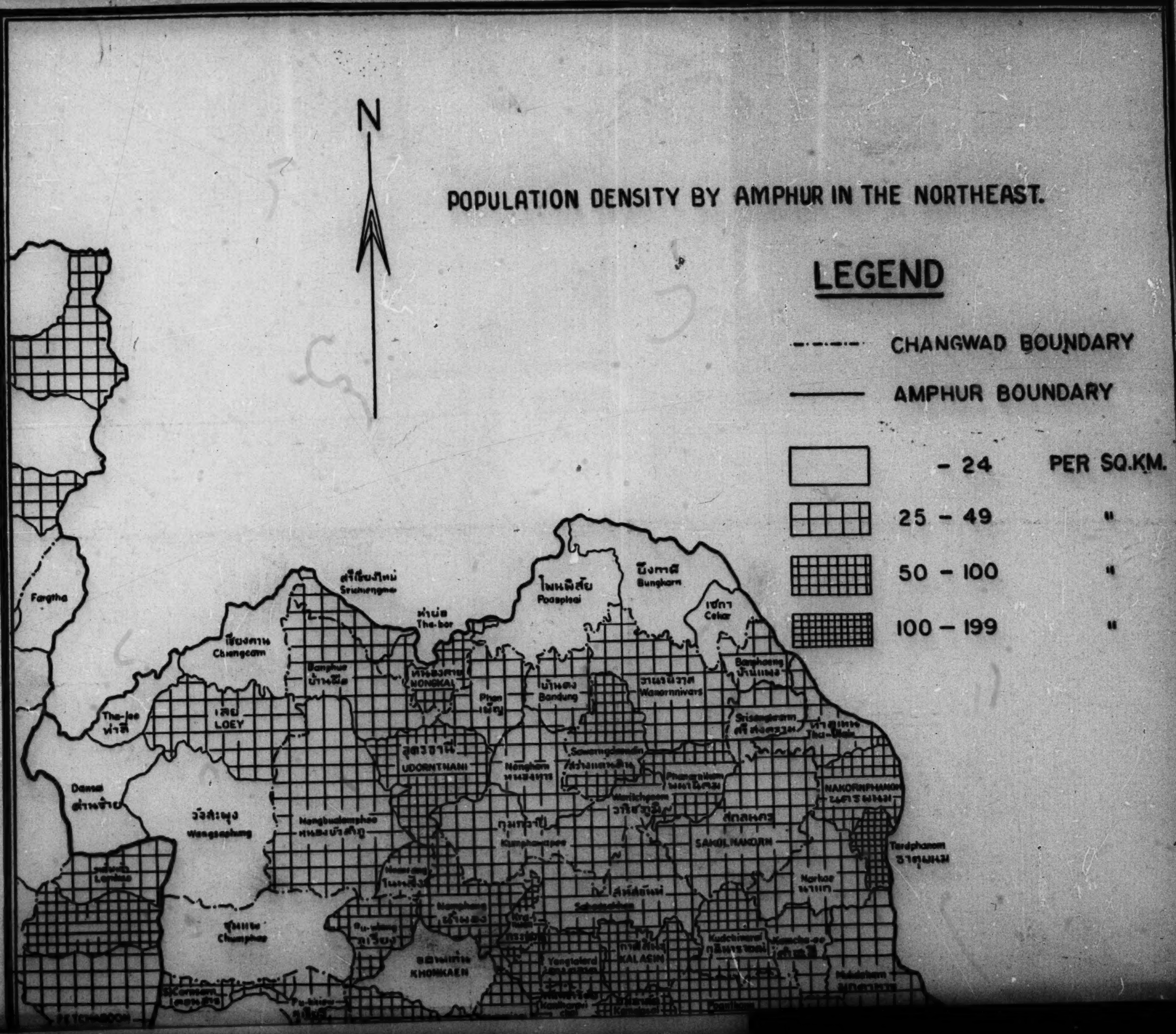
| Year | Municipal Area | Changwad | Capacity m.$^3$/ day |
|---|---|---|---|
| 1961 | Pibulmungsaharn | Ubolrajthani | 800 |
| | Yasothorn | ,, | 800 |
| | Mukdaharn | Nakornpanom | 400 |
| | Thardpanom | ,, | 400 |
| 1962 | Banphai | Khonkaen | 800 |
| | Sawangdandin | Skolnakorn | 400 |
| 1963 | Thabor | Nongkai | 800 |
| | Chingkarn | Loey | 400 |
| 1964 | Nonsila | Kalasin | 400 |
| | Chumpae | Khonkaen | 400 |
| 1965 | Lamplaimart | Burirum | 400 |
| | Soongnern | Nakornrajsima | 400 |
| | Panomprai | Roi–et | 400 |
| | Kornsawarn | Chaiyaphum | 200 |
| | Srisongkram | Nakornpanom | 200 |
| | Huaykayung | Ubolrajthani | 200 |
| 1966 | Phakpung | Chaiyaphum | 400 |
| | Ra–ngang | Surin | 400 |
| | Toomtai | Udornthani | 400 |
| | Lerngnoktha | Ubolrajthani | 200 |
| | Wangchai | Khonkaen | 200 |
| | Huaynua | Srisaket | 200 |
| | | Total | 9,200 |

### Table 17 : Changwad Waterwork in the Northeast, 1961 - 1966

| Year | Changwad | Capacity $m.^3$ / day |  |
|---|---|---|---|
|  |  | Before | After |
| 1961 | Udornthani | 800 | 1,600 |
|  | Khonkaen | 800 | 1,600 |
|  | Ubolrajthani | 800 | 1,600 |
| 1962 | Surin | 800 | 1,600 |
| 1963 | Nongkai | 400 | 800 |
| 1965 | Chaiyaphum | 800 | 1,600 |
| 1966 | Burirum | 800 | 1,600 |
|  | Total | 5,200 | 10,400 |

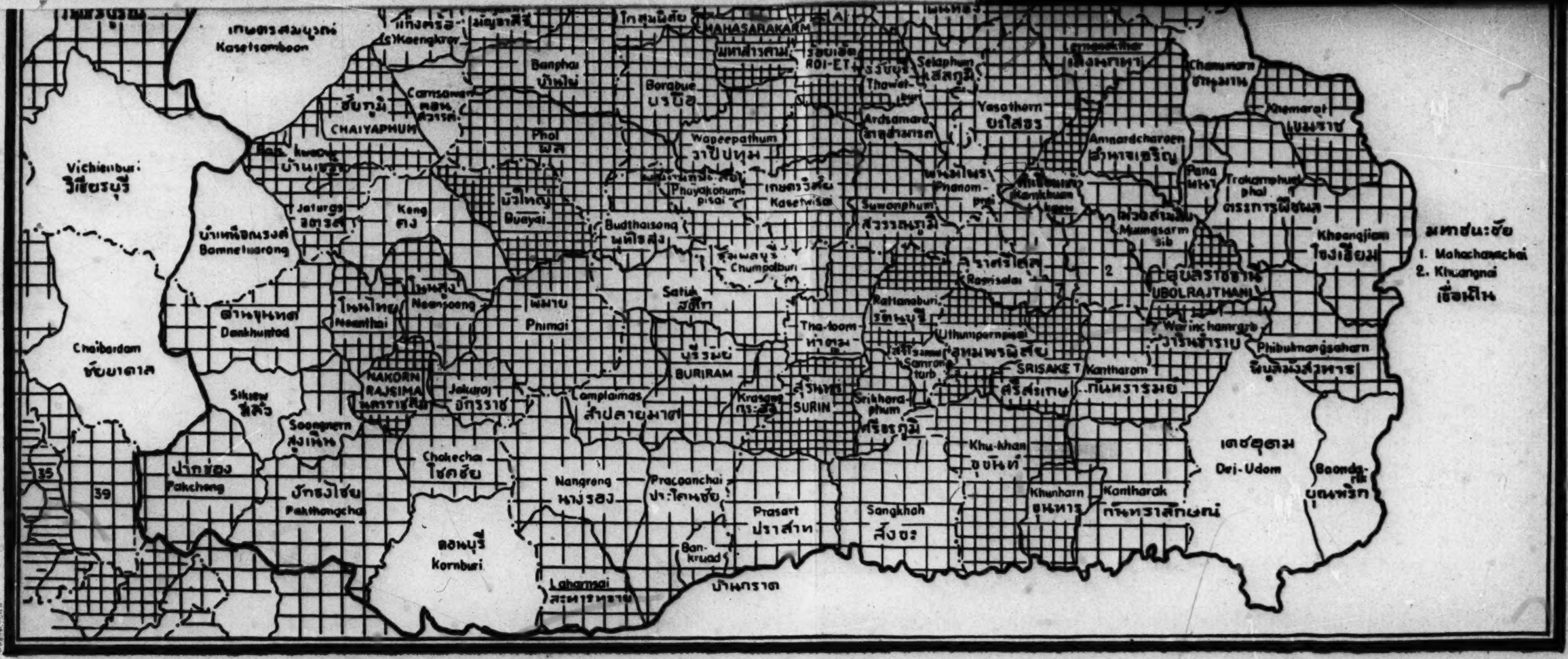
### Table 18 : Rural Health Development in the Northeast (1960)

| Changwad | No. | Family | Proper Sanitation | | |
|---|---|---|---|---|---|
| | | | Wells | Lavatory | House |
| 1. Kalasin | 6 | 844 | 24 | 17 | – |
| 2. Khonkaen | 3 | 2,338 | 55 | 199 | 1,109 |
| 3. Chaiyaphum | – | – | – | – | – |
| 4. Nakornpanom | 7 | 1,338 | 21 | 169 | – |
| 5. Nakornrajsima | 40 | 6,530 | 32 | 1,967 | – |
| 6. Nongkai | 16 | 1,725 | – | 96 | – |
| 7. Burirum | 37 | 5,807 | 67 | 977 | 596 |
| 8. Mahasarakarm | 20 | 1,926 | 3 | 22 | – |
| 9. Roi-et | 3 | 372 | 28 | 41 | – |
| 10. Loey | 14 | 2,405 | 49 | 103 | 717 |
| 11. Srisaket | 11 | 1,423 | 14 | 268 | 186 |
| 12. Skolnakorn | 4 | 923 | – | 47 | – |
| 13. Surin | 15 | 2,634 | 20 | 191 | 2,634 |
| 14. Udornthani | 182 | 16,312 | 152 | 1,297 | 10,115 |
| 15. Ubolrajthani | 53 | 5,188 | 22 | 1,313 | 2,803 |
| Total | 411 | 48,765 | 487 | 6,707 | 18,160 |

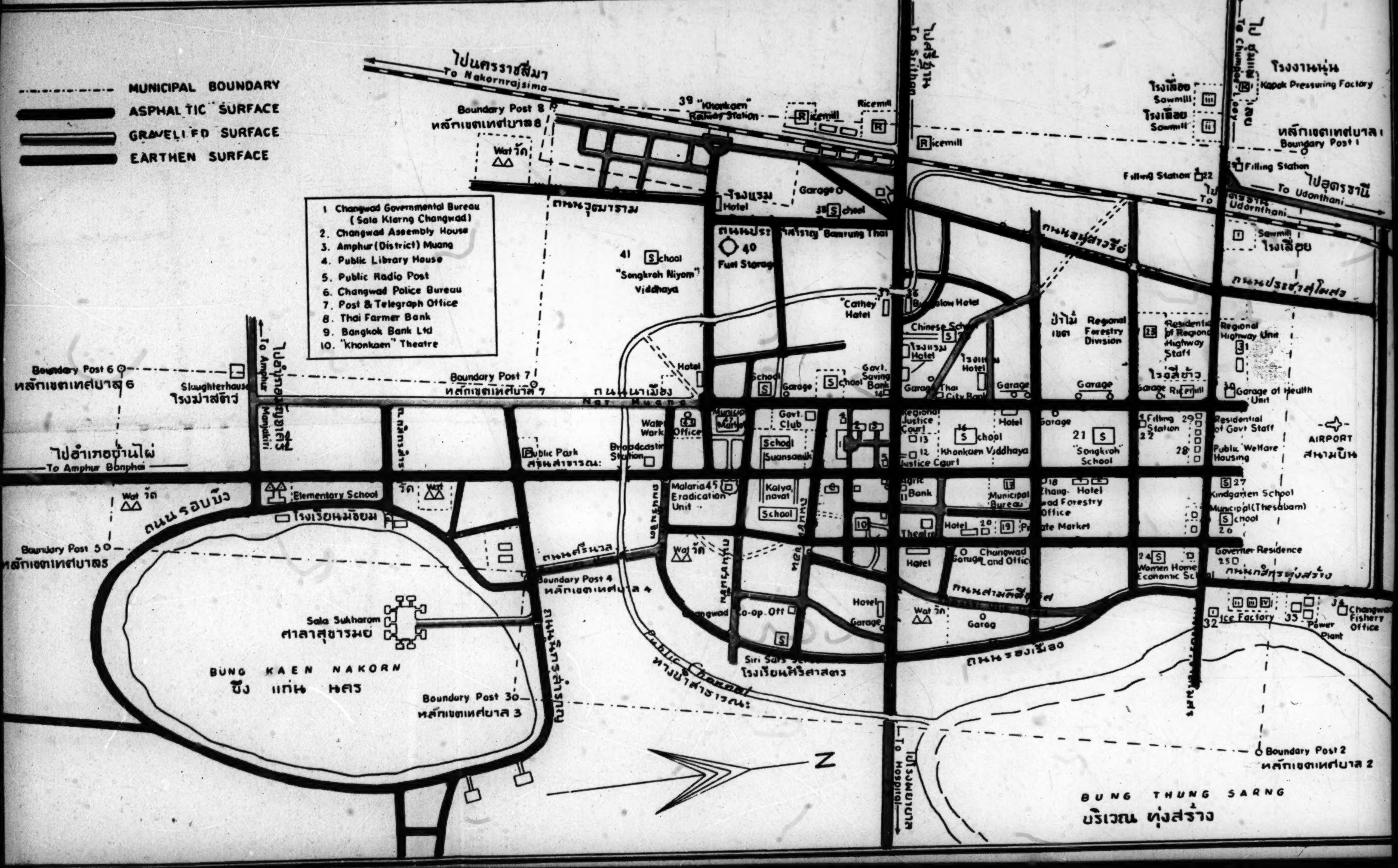


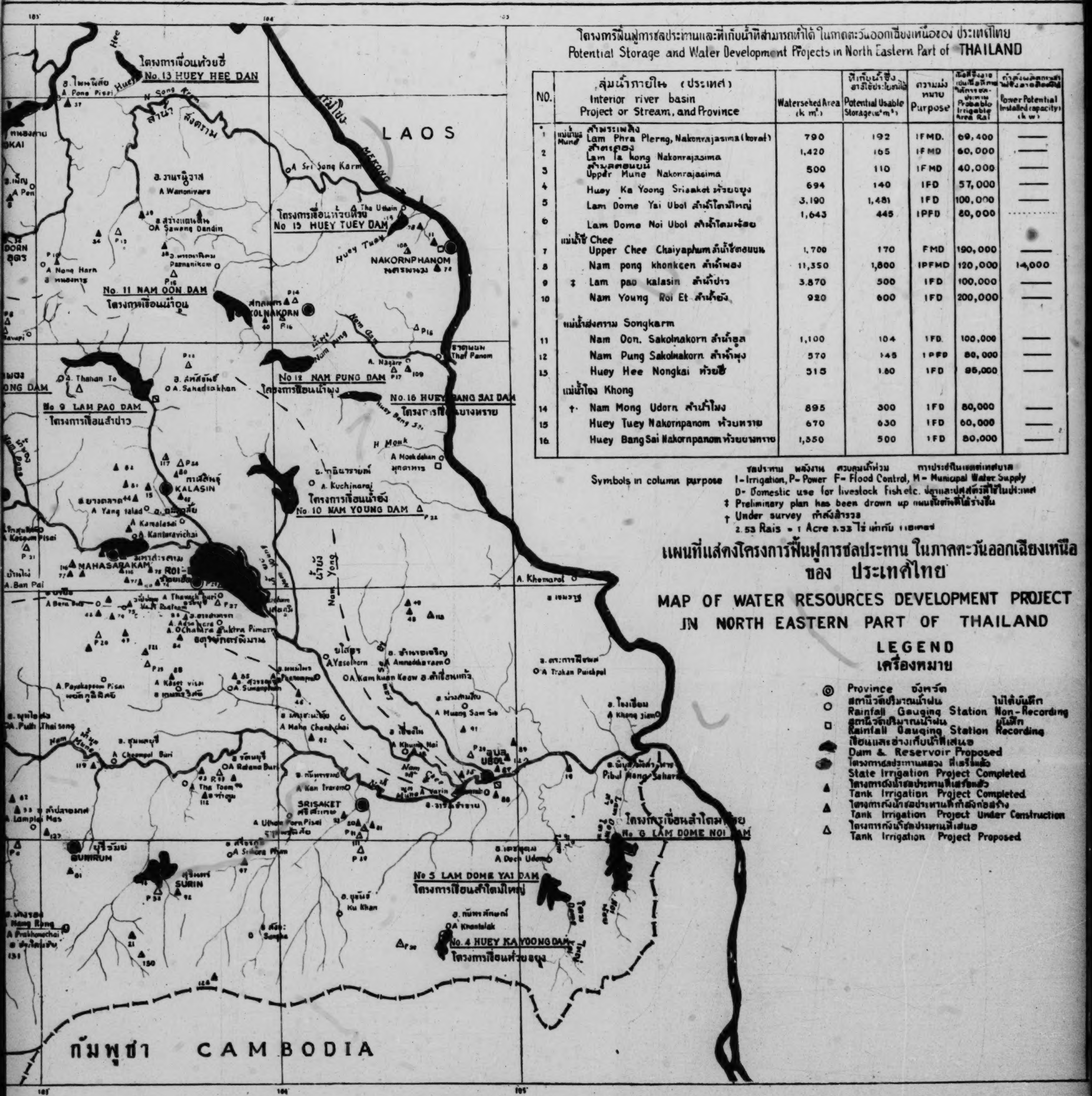
POPULATION DENSITY BY AMPHUR IN THE NORTHEAST.

N
LEGEND
CHANGWAD BOUNDARY
AMPHUR BOUNDARY
- 24 PER SQ.KM.
25 - 49 "
50 - 100 "
100 - 199 "
Fargtha
Tha-lee
ท่าลี่
เลย
LOEY
เชียงคาน
Chiengcam
Danai
ด่านซ้าย
วังสะพุง
Wangsaphung
Lomkao
ชุมแพ
Chumphae
PETCHABOON
Pu-khiew
Pu-viang
ภูเวียง
KHONKAEN
ศรีเชียงใหม่
Srichiengmai
ท่าบ่อ
Tha-bor
Banphue
บ้านผือ
หนองคาย
NONGKAI
Phen
เพ็ญ
บ้านดุง
Bandung
โพนพิสัย
Poaspisai
บึงกาฬ
Bungkarn
เซกา
Cekar
วานรนิวาส
Wanornnivars
Banphaeng
บ้านแพง
Srisongkram
ศรีสงคราม
อุดรธานี
UDORNTHANI
Nonghan
หนองหาน
Sawangdaendin
สว่างแดนดิน
Phanarnikom
พรรณานิคม
Warichphoom
วาริชภูมิ
NAKORNPHANOM
นครพนม
สกลนคร
SAKOLNAKORN
Tardphanom
ธาตุพนม
Narkae
นาแก
Nongbualamphoo
กุมภวาปี
Kumphawapee
สหัสขันธ์
Sahatsakhan
Namphong
น้ำพอง
Yangtalard
กาฬสินธุ์
KALASIN
Kuchinarai
Kamcha-ee
คำชะอี
Mukdaharn
Kamalasai


เกษตรสมบูรณ์
Kasetsomboon
แก้งคร้อ
(ร)Kaengkrov
มัญจาคีรี
โกสุมพิสัย
MAHASARAKARM
มหาสารคาม
ร้อยเอ็ด
ROI-ET
ธวัชบุรี
Thawat-buri
Selaphum
เสลภูมิ
เลิงนกทา
Chanumarn
ชานุมาน
Banphai
บ้านไผ่
Borabue
บรบือ
Camsawen
คอนสวรรค์
ชัยภูมิ
CHAIYAPHUM
Phol
พล
Wapeepathum
วาปีปทุม
Ardsamard
อาจสามารถ
Yasothorn
ยโสธร
Amnardcharoen
อำนาจเจริญ
Khemarat
เขมราช
Vichienburi
วิเชียรบุรี
บ้านเขว้า
Jaturas
จัตุรัส
Keng
คง
บัวใหญ่
Buayai
พยัคฆภูมิพิสัย
Phayakphum-pisai
เกษตรวิสัย
Kasetwisai
Suwanphum
สุวรรณภูมิ
พนมไพร
Phanom-prai
Kamkhuan-kaew
Pana
พนา
Trakarnphud-phal
ตระการพืชผล
ม่วงสามสิบ
Muangsarm-sib
Khoangjiam
โขงเจียม
มหาชนะชัย
1. Mahachanachai
2. Khuangnai
เขื่องใน
1
2
บำเหน็จณรงค์
Bamnetnarong
Budthaisong
พุทไธสง
ชุมพลบุรี
Chumpolburi
ราษีไศล
Rasrisalai
อุบลราชธานี
UBOLRAJTHANI
ด่านขุนทด
Dankhuntod
โนนไทย
Noanthai
โนนสูง
Noansoong
พิมาย
Phimai
Satuk
สตึก
Rattanaburi
รัตนบุรี
Tha-toom
ท่าตูม
Uthumpornpisai
อุทุมพรพิสัย
Warinchamrab
วารินชำราบ
Phibulmangsaharn
พิบูลมังสาหาร
Chaibadarn
ชัยบาดาล
บุรีรัมย์
BURIRAM
สำโรงทาบ
Samrong-tarb
SRISAKET
ศรีสะเกษ
Kantharom
กันทรารมย์
NAKORN RAJSIMA
นครราชสีมา
Jakaraj
จักราช
Lamplaimas
ลำปลายมาศ
Krasang
กระสัง
สุรินทร์
SURIN
Srikhora-phum
ศรีขรภูมิ
Sikiew
สีคิ้ว
Soongnern
สูงเนิน
Khu-khan
ขุขันธ์
เดชอุดม
Dej-Udom
ปากช่อง
Pakchong
Chokechai
โชคชัย
Nangrong
นางรอง
Pracoanchai
ประโคนชัย
Boonda-rik
บุณฑริก
35
39
ปักธงชัย
Pakthongchai
Prasart
ปราสาท
Sangkhah
สังขะ
Khunharn
ขุนหาร
Kantharak
กันทรลักษณ์
ครบุรี
Kornburi
Ban-kruad
บ้านกรวด
Lahansai
ละหานทราย

# MAP OF
# KHONKAEN MUNICIPALITY'S AREA


MUNICIPAL BOUNDARY
ASPHALTIC SURFACE
GRAVELLED SURFACE
EARTHEN SURFACE
1 Changwad Governmental Bureau (Sala Klarng Changwad)
2. Changwad Assembly House
3. Amphur (District) Muang
4. Public Library House
5. Public Radio Post
6. Changwad Police Bureau
7. Post & Telegraph Office
8. Thai Farmer Bank
9. Bangkok Bank Ltd
10. "Khonkaen" Theatre
ไปนครราชสีมา
To Nakornrajsima
39 "Khonkaen" Railway Station
Ricemill
To Srithan
ไปศรีฐาน
To Chumpae Loey
ไปชุมแพ เลย
โรงงานนุ่น
Kapok Pressuring Factory
โรงเลื่อย Sawmill
หลักเขตเทศบาล 1
Boundary Post 1
Filling Station 22
Filling Station
ไปอุดรธานี
To Udonthani
Boundary Post 8
หลักเขตเทศบาล 8
Wat วัด
ถนนวุฒาราม
โรงแรม Hotel
Garage
38 School
ถนนประชาสำราญ Bamrung Thai
40 Fuel Storage
41 School "Songkroh Niyom" Viddhaya
ถนนหน้าสถานี
ถนนประชาสโมสร
"Cathey" Hotel
Bungalow Hotel
Chinese School
ป่าไม้เขต Regional Forestry Division
Residential of Regional Highway Staff
Regional Highway Unit
To Amphur Manjakiri
ไปอำเภอมัญจาคีรี
Boundary Post 6
หลักเขตเทศบาล 6
Slaughterhouse
โรงฆ่าสัตว์
Boundary Post 7
หลักเขตเทศบาล 7
ถนนหน้าเมือง
Nar Muang
Hotel
School
Garage
Govt. Saving Bank
Thai City Bank
โรงสีข้าว Ricemill
Garage of Health Unit
ถ.กลางเมือง
Water Work Office
Municipal Market
Govt. Club
Regional Justice Court
Khonkaen Viddhaya
21 Songkroh School
Filling Station 29
Residential of Govt Staff
Public Welfare Housing
AIRPORT
สนามบิน
ไปอำเภอบ้านไผ่
To Amphur Banphai
Public Park
สวนสาธารณะ
Broadcasting Station
Suansanuk
Justice Court
Wat วัด
Elementary School
Malaria Eradication Unit
Kalyanavat School
Agric. Bank
Municipal Bureau
Chang Hotel
Regional Forestry Office
Kindgarten School
Municipal (Thesabam) School
ถนนรอบบึง
โรงเรียนมัธยม
Theatre
Private Market
Boundary Post 5
หลักเขตเทศบาล 5
ถนนศรีนวล
Changwad Land Office
Women Home Economic School
Governor Residence
ถนนกสิกรทุ่งสร้าง
Boundary Post 4
หลักเขตเทศบาล 4
ถนนศรีจันทร์
Sala Sukharom
ศาลาสุขารมย์
Changwad Co-op. Off
Garag
Ice Factory
Power Plant
Changwad Fishery Office
BUNG KAEN NAKORN
บึง แก่น นคร
Boundary Post 3
หลักเขตเทศบาล 3
Siri Sars School
โรงเรียนศรีสาสตร
Public Channel
ทางน้ำสาธารณะ
ถนนรอบเมือง
To Hospital
ไปโรงพยาบาล
N
Boundary Post 2
หลักเขตเทศบาล 2
BUNG THUNG SARNG
บริเวณ ทุ่งสร้าง


LAOS
แม่น้ำโขง
MEKONG
กัมพูชา CAMBODIA
โครงการเขื่อนห้วยฮี
No. 13 HUEY HEE DAN
โครงการเขื่อนห้วยทราย
No 15 HUEY TUEY DAM
NAKORNPHANOM
No. 11 NAM OON DAM
โครงการเขื่อนน้ำอูน
SAKOLNAKORN
No 12 NAM PUNG DAM
โครงการเขื่อนน้ำพุง
No. 16 HUEY BANG SAI DAM
โครงการเขื่อนบางทราย
No 9 LAM PAO DAM
โครงการเขื่อนลำปาว
KALASIN
โครงการเขื่อนน้ำยัง
No. 10 NAM YOUNG DAM
MAHASARAKAM
ROI-ET
UBOL
SRISAKET
โครงการเขื่อนลำโดมน้อย
No. 6 LAM DOME NOI DAM
No 5 LAM DOME YAI DAM
โครงการเขื่อนลำโดมใหญ่
SURIN
BURIRUM
No. 4 HUEY KA YOONG DAM
โครงการเขื่อนห้วยขยุง
103°
104°
105°

## โครงการฟื้นฟูการชลประทานและที่เก็บน้ำที่สามารถทำได้ ในภาคตะวันออกเฉียงเหนือของ ประเทศไทย
## Potential Storage and Water Development Projects in North Eastern Part of THAILAND

| NO. | ลุ่มน้ำภายใน (ประเทศ) Interior river basin Project or Stream, and Province | Watersehed Area (k m².) | ที่เก็บน้ำซึ่งสามารถใช้ประโยชน์ได้ Potential Usable Storage (10⁶m³) | ความมุ่งหมาย Purpose | Probable Irrigable Area Rai | Power Potential Installed capacity (k w) |
|---|---|---|---|---|---|---|
| 1 | แม่น้ำมูล Mune ลำพระเพลิง Lam Phra Plerng, Nakonrajasima (korat) | 790 | 192 | IFMD. | 69,400 | — |
| 2 | ลำตะคอง Lam Ta kong Nakonrajasima | 1,420 | 165 | IFMD | 60,000 | — |
| 3 | ลำมูลตอนบน Upper Mune Nakonrajasima | 500 | 110 | IFMD | 40,000 | — |
| 4 | Huey Ka Yoong Srisaket ห้วยขยุง | 694 | 140 | IFD | 57,000 | — |
| 5 | Lam Dome Yai Ubol ลำน้ำโดมใหญ่ | 3,190 | 1,481 | IFD | 100,000 | — |
| 6 | Lam Dome Noi Ubol ลำน้ำโดมน้อย | 1,643 | 445 | IPFD | 80,000 | …… |
|  | แม่น้ำชี Chee |  |  |  |  |  |
| 7 | Upper Chee Chaiyaphum ลำน้ำชีตอนบน | 1,700 | 170 | FMD | 190,000 | — |
| 8 | Nam pong khonkeen ลำน้ำพอง | 11,350 | 1,800 | IPFMD | 120,000 | 14,000 |
| 9 | ‡ Lam pao kalasin ลำน้ำปาว | 3.870 | 500 | IFD | 100,000 | — |
| 10 | Nam Young Roi Et ลำน้ำยัง | 920 | 600 | IFD | 200,000 | — |
|  | แม่น้ำสงคราม Songkarm |  |  |  |  |  |
| 11 | Nam Oon. Sakolnakorn ลำน้ำอูน | 1,100 | 104 | IFD. | 100,000 | — |
| 12 | Nam Pung Sakolnakorn ลำน้ำพุง | 570 | 145 | IPFD | 80,000 | — |
| 13 | Huey Hee Nongkai ห้วยฮี | 515 | 1.80 | IFD | 95,000 | — |
|  | แม่น้ำโขง Khong |  |  |  |  |  |
| 14 | † Nam Mong Udorn ลำน้ำโมง | 895 | 300 | IFD | 80,000 | — |
| 15 | Huey Tuey Nakornpanom ห้วยทราย | 670 | 630 | IFD | 60,000 | — |
| 16 | Huey Bang Sai Nakornpanom ห้วยบางทราย | 1,350 | 500 | IFD | 80,000 | — |

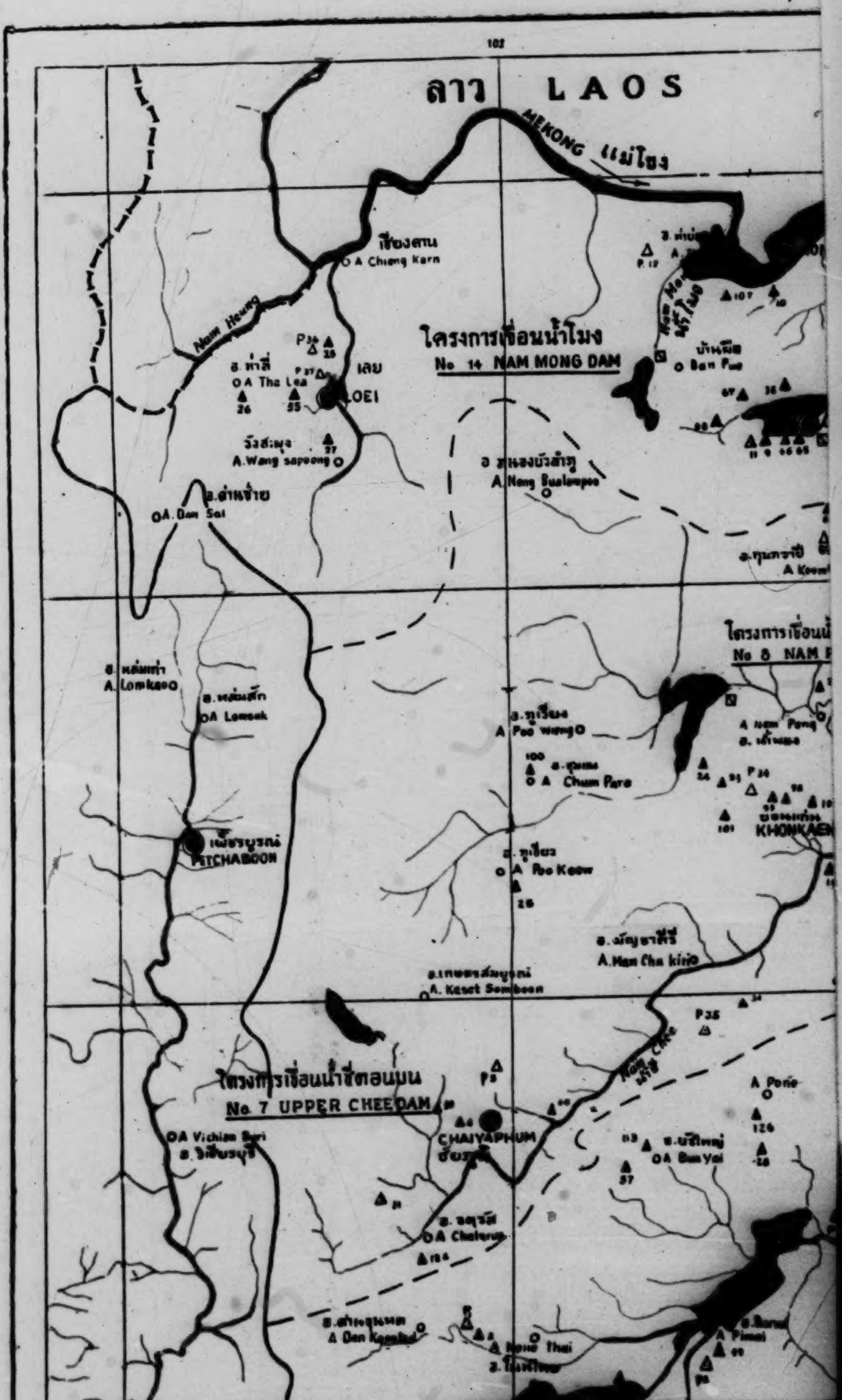
ชลประทาน พลังงาน ควบคุมน้ำท่วม การประปาในเขตเทศบาล
Symbols in column purpose I-Irrigation, P-Power F- Flood Control, M- Municipal Water Supply
D- Domestic use for livestock Fish etc. ปลาและปศุสัตว์ที่ใช้ในประเทศ
‡ Preliminary plan has been drawn up แผนขั้นต้นที่ได้ร่างขึ้น
† Under survey กำลังสำรวจ
2.53 Rais = 1 Acre 2.53 ไร่ เท่ากับ 1 เอเคอร์

# แผนที่แสดงโครงการฟื้นฟูการชลประทาน ในภาคตะวันออกเฉียงเหนือ ของ ประเทศไทย

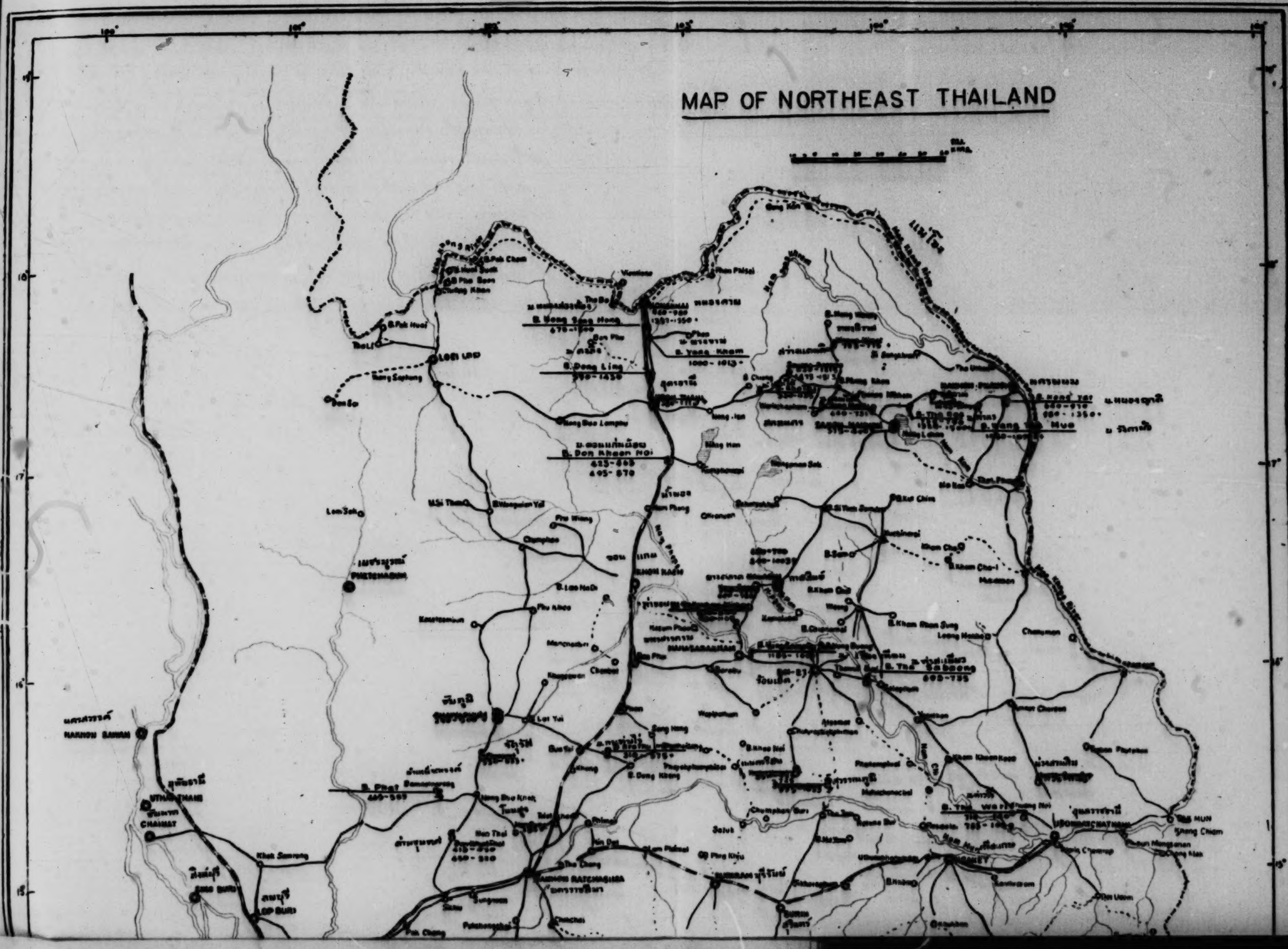
# MAP OF WATER RESOURCES DEVELOPMENT PROJECT IN NORTH EASTERN PART OF THAILAND

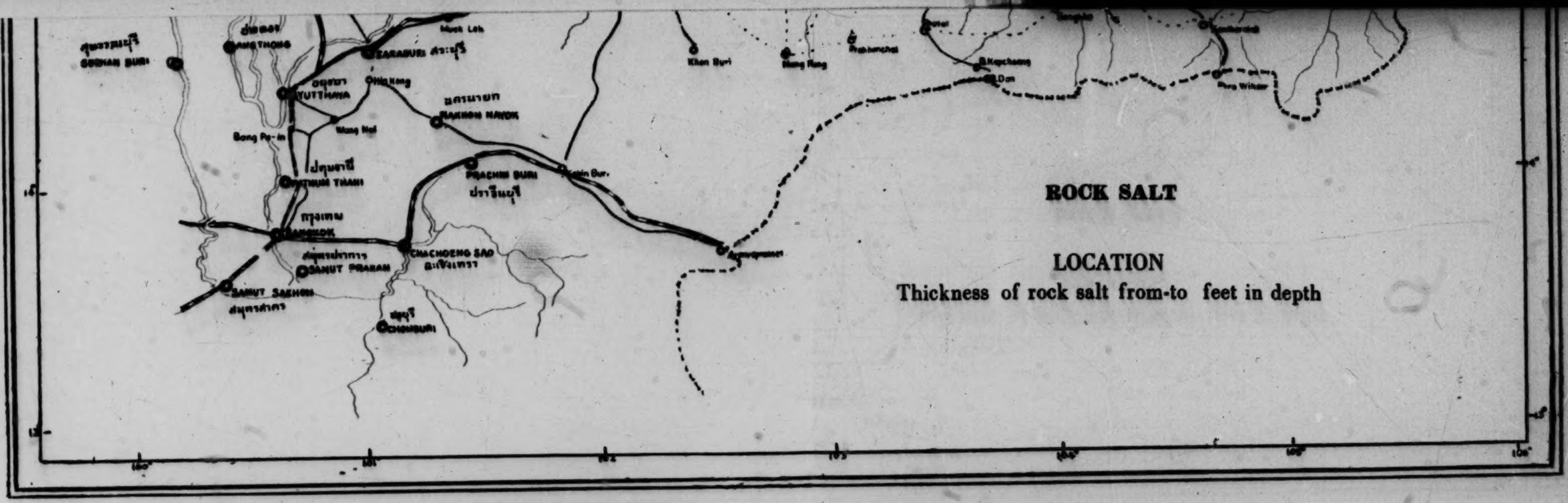
## LEGEND
## เครื่องหมาย

- ◎ Province จังหวัด
- ○ สถานีวัดปริมาณน้ำฝน ไม่ได้บันทึก Rainfall Gauging Station Non-Recording
- □ สถานีวัดปริมาณน้ำฝน บันทึก Rainfall Gauging Station Recording
- ● เขื่อนและอ่างเก็บน้ำที่เสนอ Dam & Reservoir Proposed
- ● โครงการชลประทานหลวง ที่เสร็จแล้ว State Irrigation Project Completed
- ▲ โครงการถังน้ำชลประทานที่เสร็จแล้ว Tank Irrigation Project Completed
- ▲ โครงการถังน้ำชลประทานที่กำลังก่อสร้าง Tank Irrigation Project Under Construction
- △ โครงการถังน้ำชลประทานที่เสนอ Tank Irrigation Project Proposed



ลาว LAOS
MEKONG แม่โขง
102
เชียงคาน
A Chiang Karn
Nam Heung
เลย
LOEI
A Tha Lee
A. Wang saphoong
A. Dan Sai
โครงการเขื่อนน้ำโมง
No. 14 NAM MONG DAM
A. Nong Bualamphoo
Ban Pue
A. Lomkao
A Lomsak
เพชรบูรณ์
PETCHABOON
A Poo wiang
A Chum Pare
A Poo Keow
A. Kaset Somboon
A. Man Cha kiri
KHONKAEN
No 8 NAM P
A Nam Pong
โครงการเขื่อนน้ำชีตอนบน
No. 7 UPPER CHEE DAM
CHAIYAPHUM
ชัยภูมิ
Nam Chee
A Vichian Buri
A Chatorut
A Pono
A Ban Yai
A Don Koonkut
Nong Thai
A Pimai
NAKORNRAJSIMA
A Soongnern
A Pakthongchai
A Choke chai
No. 2 LAM TAKONG DAM
No. 1 LAM PHRA PLERNG DAM
โครงการเขื่อนน้ำมูลตอนบน
No. 3 UPPER MUNE DAM
102°


MAP OF NORTHEAST THAILAND
Vientiane
LOEI
B. Dong Sang Hong
B. Don Khoon Noi
PHETCHABUN
KHON KAEN
NAKHON SAWAN
UTHAI THANI
CHAINAT
SING BURI
LOP BURI
NAKHON RATCHASIMA
MAHASARAKHAM
B. Tha Sabaeng
B. Phai
UBON RATCHATHANI
THA MUN
B. Na Di

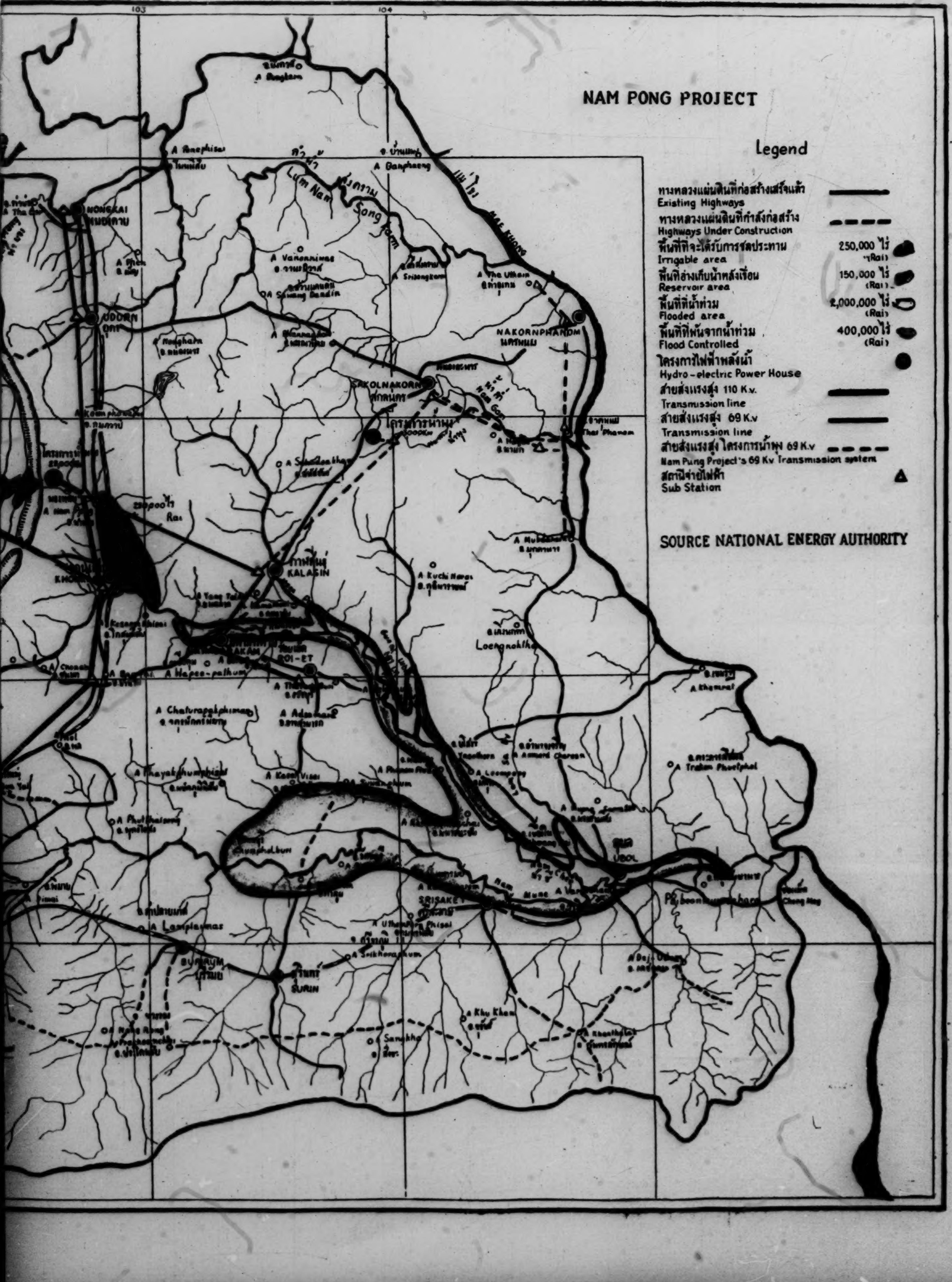

SUPHAN BURI
ANGTHONG
SARABURI
AYUTTHAYA
Bang Pa-in
PATHUM THANI
BANGKOK
SAMUT PRAKAN
SAMUT SAKHON
CHONBURI
CHACHOENG SAO
PRACHIN BURI
NAKHON NAYOK
Khon Buri
Kabin Buri
14°
13°
100°
101°
102°
103°
104°
105°
106°

**ROCK SALT**

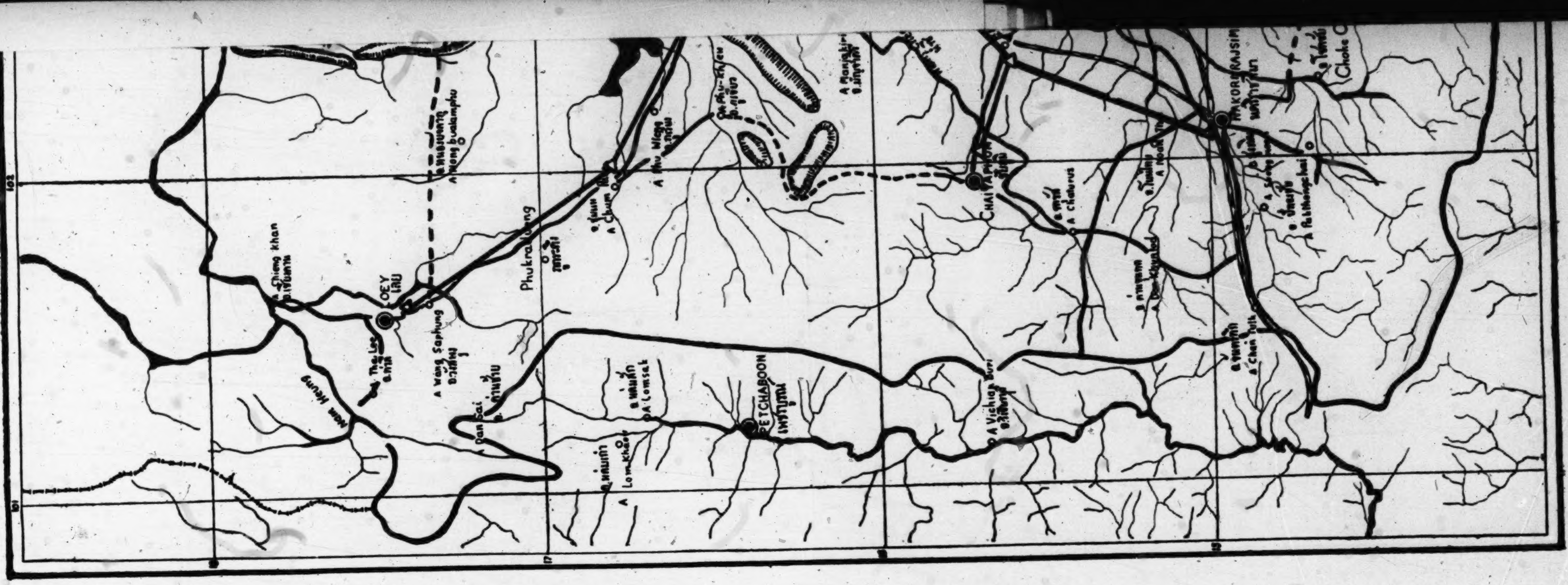
LOCATION

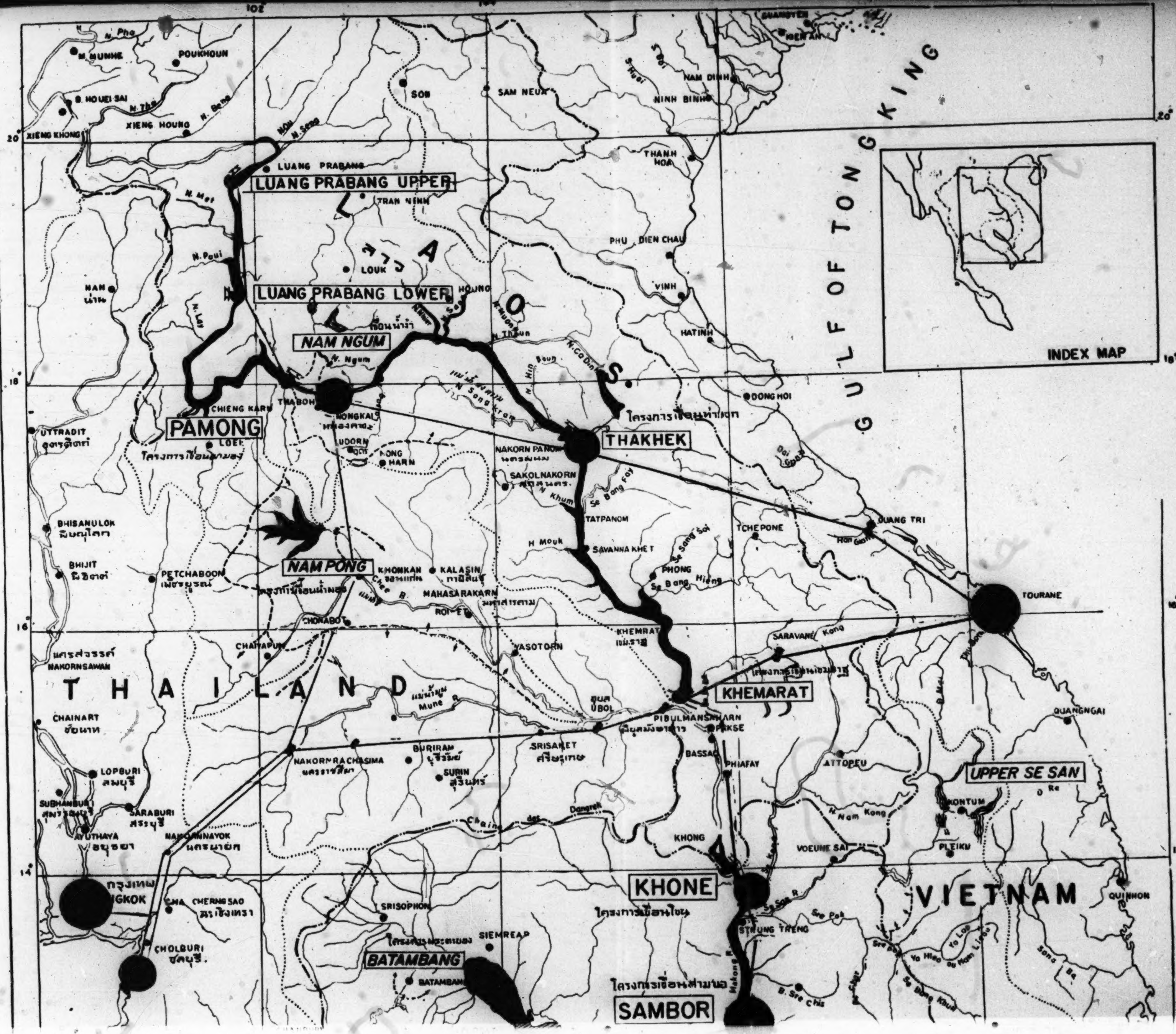
Thickness of rock salt from-to feet in depth

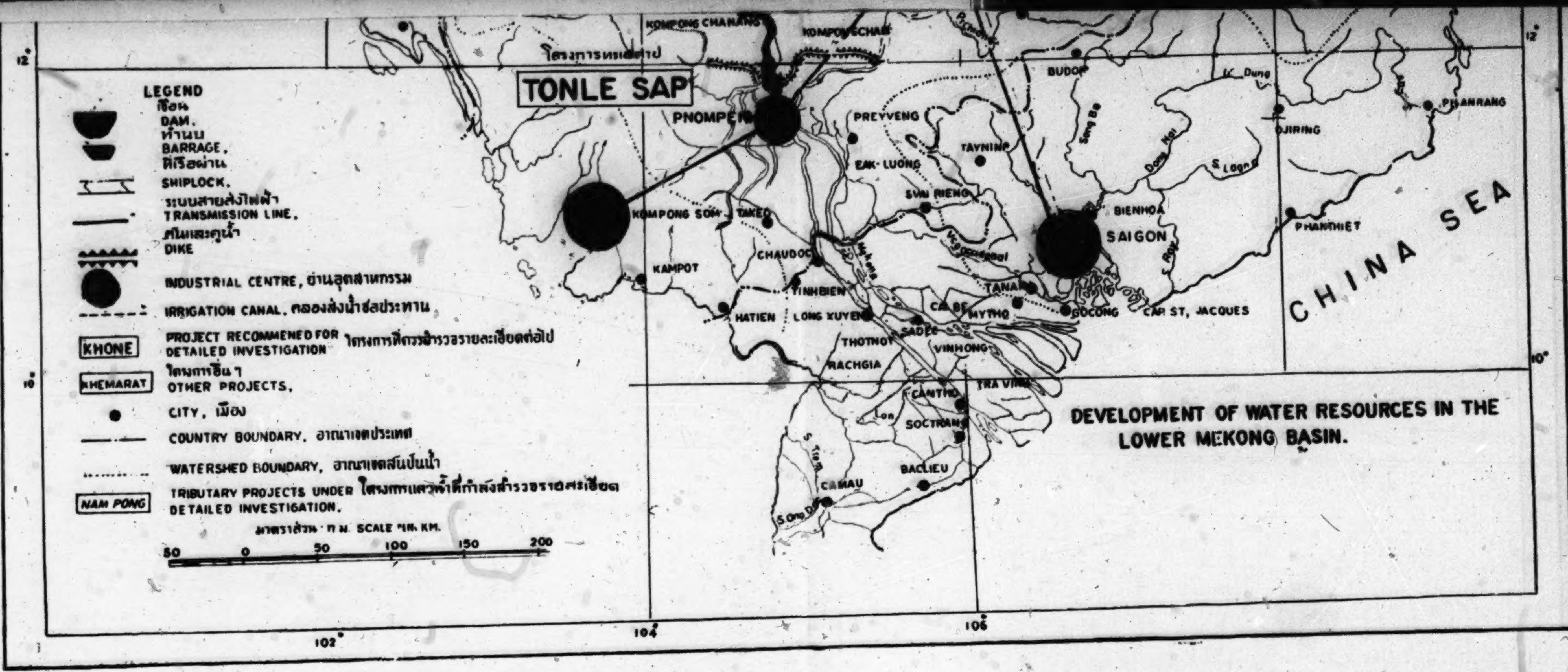
## NAM PONG PROJECT


Legend
ทางหลวงแผ่นดินที่ก่อสร้างเสร็จแล้ว
Existing Highways
ทางหลวงแผ่นดินที่กำลังก่อสร้าง
Highways Under Construction
พื้นที่ที่จะได้รับการชลประทาน
Irrigable area
250,000 ไร่ (Rai)
พื้นที่อ่างเก็บน้ำหลังเขื่อน
Reservoir area
150,000 ไร่ (Rai)
พื้นที่ที่น้ำท่วม
Flooded area
2,000,000 ไร่ (Rai)
พื้นที่ที่พ้นจากน้ำท่วม
Flood Controlled
400,000 ไร่ (Rai)
โครงการไฟฟ้าพลังน้ำ
Hydro-electric Power House
สายส่งแรงสูง 110 K.v.
Transmission line
สายส่งแรงสูง 69 K.v
Transmission line
สายส่งแรงสูง โครงการน้ำพุง 69 K.v
Nam Pung Project's 69 Kv Transmission system
สถานีจ่ายไฟฟ้า
Sub Station
103
104
MAE KHONG
แม่น้ำโขง
Lum Nam Song Kram
NONGKAI
หนองคาย
UDORN
อุดร
SAKOLNAKORN
สกลนคร
NAKORNPHANOM
นครพนม
KALASIN
กาฬสินธุ์
ROI-ET
ร้อยเอ็ด
SRISAKET
UBOL
SURIN
BURIRUM
KHON
Thai Phanom
Loengnoktha
Nam Mune
Phiboonmungsaharn
Chong Mek
A Bungkarn
A Banphaeng
A Sisongkram
A Vanonniwas
A Sawang Dandin
A Tha Uthen
A Phonphisai
A Kuchi Narai
A Mukdahan
A Khemrat
A Trakan Phuetphol
A Yasothorn
A Amnat Charoen
A Loeumpang
A Hapoo-palhum
A Chaturaphakphiman
A Adsamart
A Kaset Visai
A Phayakkhumphisai
A Phutthaisong
A Lamplaimas
A Uthomphon Phisai
A Srikhoraphum
A Khu Khan
A Sangkha
A Nang Rong
A Det Udom
A Kantharalak
A Yang Talad
250,000 ไร่ Rai

SOURCE NATIONAL ENERGY AUTHORITY

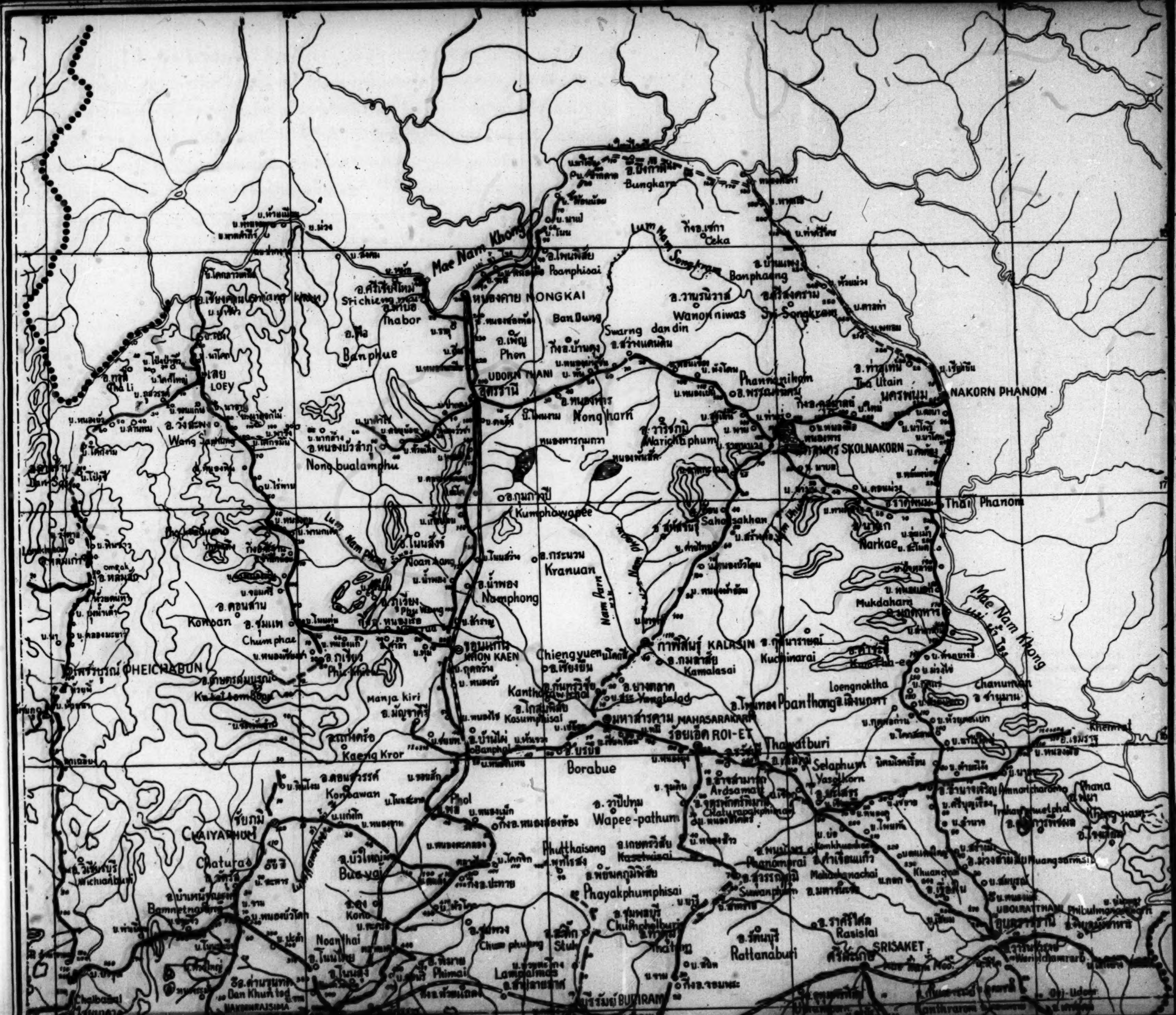

LOEY
A Chieng khan
A Tha Lee
A Wang Saphung
A Dansai
Phukradung
A Chum
A Lom Khao
A Lomsak
PETCHABOON
A Vichien Buri
CHAIYAPHUM
A Chaturus
NAKORNRAJSIM
A Chok Chai
102
101
17

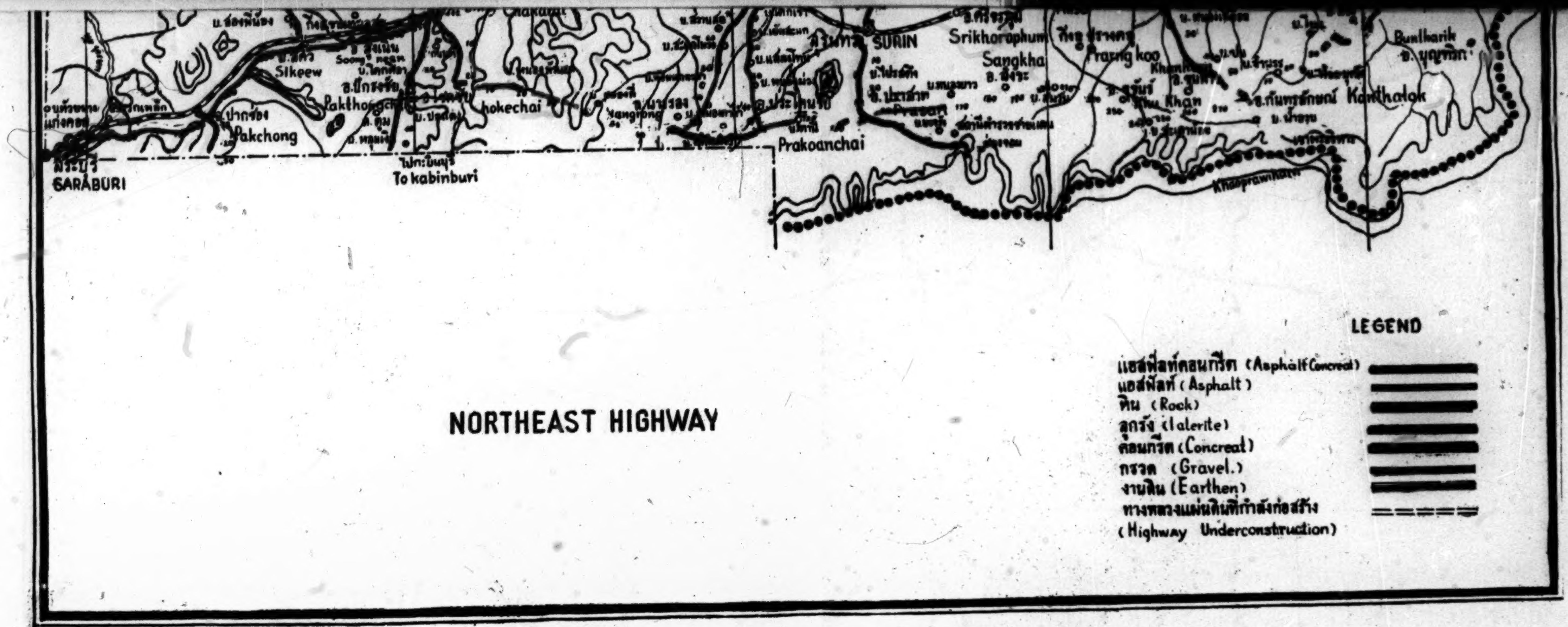

LUANG PRABANG UPPER
LUANG PRABANG LOWER
NAM NGUM
PAMONG
โครงการเขื่อนผามอง
THAKHEK
โครงการเขื่อนท่าแขก
NAM PONG
KHEMARAT
KHONE
โครงการเขื่อนโขน
SAMBOR
โครงการเขื่อนสามบอ
BATAMBANG
UPPER SE SAN
LAOS
ลาว
THAILAND
VIETNAM
GULF OF TONGKING
INDEX MAP
LUANG PRABANG
TRAN NINH
SAM NEUA
SOB
POUKHOUN
B. HOUEI SAI
XIENG KHONG
XIENG HOUNG
NAM DINH
NINH BINH
THANH HOA
PHU DIEN CHAU
VINH
HATINH
DONG HOI
QUANG TRI
TOURANE
QUANGNGAI
QUINHON
KONTUM
PLEIKU
ATTOPEU
SARAVANE
TCHEPONE
SAVANNAKHET
TATPANOM
NAKORN PANOM
SAKOLNAKORN
NONGKAI
CHIENG KARN
THABOH
LOEI
UDORN
NONG HARN
KHONKAN
KALASIN
MAHASARAKARN
ROI-ET
YASOTORN
KHEMRAT
UBOL
PIBULMANSAHARN
PAKSE
BASSAC
PHIAFAY
KHONG
VOEUNE SAI
STRUNG TRENG
SRISAKET
SURIN
BURIRAM
NAKORN RACHASIMA
CHAIYAPUM
CHONABOT
PETCHABOON
BHIJIT
BHISANULOK
UTTRADIT
NAN
NAKORNSAWAN
CHAINART
LOPBURI
SUBHANBURI
AYUTHAYA
SARABURI
NAKORNNAYOK
BANGKOK
CHERNGSAO
CHOLBURI
SRISOPHON
SIEMREAP
BATAMBANG
20°
18°
16°
14°
102
104



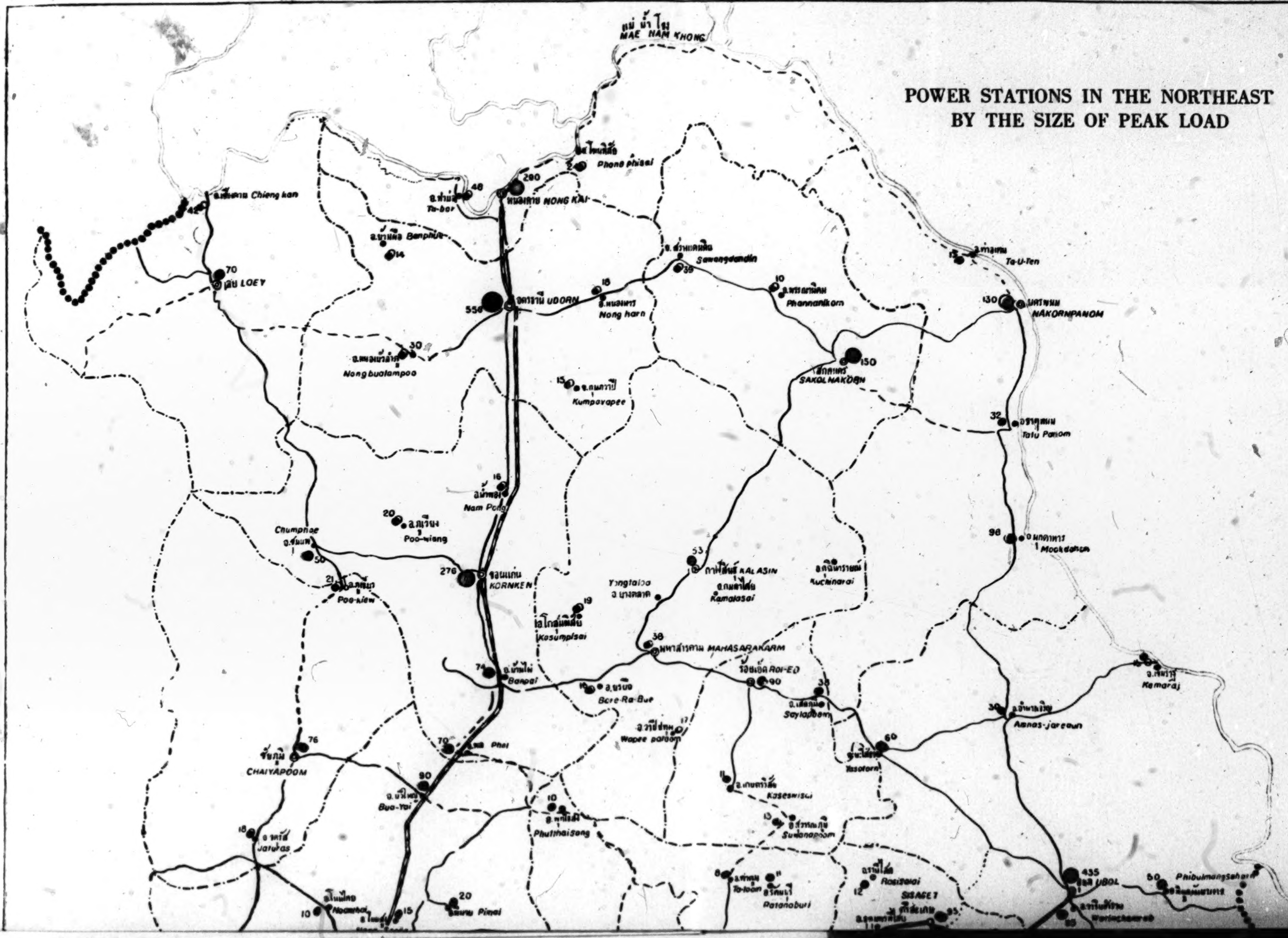
TONLE SAP
LEGEND
DAM.
BARRAGE.
SHIPLOCK.
TRANSMISSION LINE.
DIKE
INDUSTRIAL CENTRE,
IRRIGATION CANAL,
KHONE
PROJECT RECOMMENED FOR DETAILED INVESTIGATION
KHEMARAT
OTHER PROJECTS.
CITY,
COUNTRY BOUNDARY,
WATERSHED BOUNDARY,
NAM PONG
TRIBUTARY PROJECTS UNDER DETAILED INVESTIGATION.
SCALE IN KM.
50
0
50
100
150
200
KOMPONG CHANANG
KOMPONG CHAM
PNOMPENH
PREYVENG
TAYNINH
EAK LUONG
SVAI RIENG
KOMPONG SOM
TAKEO
CHAUDOC
KAMPOT
TINHBIEN
HATIEN
LONG XUYEN
CAI BE
MYTHO
TANAN
SADEC
VINHLONG
THOTNOT
RACHGIA
CANTHO
TRA VINH
SOCTRANG
BACLIEU
CAMAU
SAIGON
BIENHOA
GOCONG
CAP ST. JACQUES
BUDOP
DJIRING
PHANRANG
PHANTHIET
CHINA SEA
12°
10°
102°
104°
106°

DEVELOPMENT OF WATER RESOURCES IN THE LOWER MEKONG BASIN.

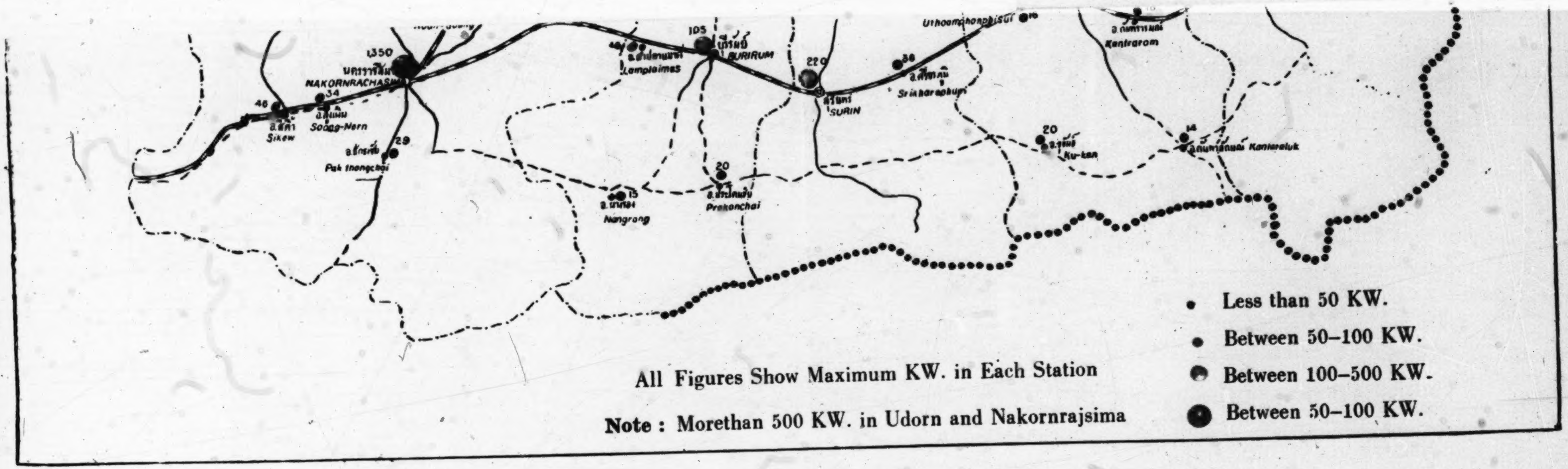

Mae Nam Khong
NONGKAI
Bungkarn
Ceka
Lum Nam Songkram
Banphaeng
Poanphisai
Stichieng mai
Chieng khan
Thabor
Banphue
Ban Dung
Wanon niwas
Sri Songkram
Phon
Swarng dandin
Tha Li
LOEY
Wang Saphung
UDORN THANI
Nong harn
Phannanikhom
Tha Utain
NAKORN PHANOM
Nong bualamphu
Warichaphum
SKOLNAKORN
Dan Sai
Kumphawapee
Thad Phanom
Lum Nam Phong
Sahatsakhan
Narkae
Noan sang
Kranuan
Namphong
Nam Parn
Mukdaham
Mae Nam Khong
Komoan
Chumphae
Phu Wiang
KHON KAEN
Chiengyuen
KALASIN
Kuchinarai
Kamalasai
PHEICHABUN
Phu Khieo
Kanthorawichai
Yangtalad
Loengnoktha
Chanuman
Manja kiri
Kosumphisai
MAHASARAKARM
Poanthang
ROI-ET
Thawatburi
Kaeng Kror
Banphai
Borabue
Selaphum
Yasothorn
Khemrat
Konsawan
Phol
Ardsamart
Chaturaphakphiman
Amnatcharoen
CHAIYAPHUM
Wapee-pathum
Chatura
Buayai
Phutthaisong
Kasetwisai
Phanomprai
Khueng nai
Wichianburi
Phayakphumphisai
Suwanphum
Mahachanachai
Bamnetnarong
Kong
Chumphonburi
Noanthai
Chum phuang
Stuk
Thatum
Rattanaburi
Rasisilai
SRISAKET
UBONRATTHANI
Phibulmangsaharn
Phimai
Lamplaimas
Warinchamrap
Chaibadan
Dan Khun tod
NAKORNRAJSIMA
BURIRAM
Kanthrarom
Det Udom


SARABURI
สระบุรี
Pakchong
Sikeew
Pakthongchai
hokechai
Nangrong
To kabinburi
Prakoanchai
SURIN
Srikhoraphum
Sangkha
Prasat
Prang koo
Khu Khan
Kanthalok
Bunlharik
Khaoprawihan
NORTHEAST HIGHWAY
LEGEND
แอสฟัลท์คอนกรีต (Asphalt Concreat)
แอสฟัลท์ (Asphalt)
หิน (Rock)
ลูกรัง (lalerite)
คอนกรีต (Concreat)
กรวด (Gravel.)
งานดิน (Earthen)
ทางหลวงแผ่นดินที่กำลังก่อสร้าง
(Highway Underconstruction)

# POWER STATIONS IN THE NORTHEAST BY THE SIZE OF PEAK LOAD



แม่ น้ำ โขง
MAE NAM KHONG
Phone phisai
280
NONG KAI
48
Ta-bor
42
Chieng kan
Banphue
14
70
LOEY
556
UDORN
18
Nong harn
Sawangdandin
39
10
Phannanikom
13
Ta-U-Ten
130
NAKORNPANOM
150
SAKOL NAKORN
30
Nongbualampoo
15
Kumpavapee
32
Tatu Panom
16
Nam Pong
20
Poo-wiang
Chumphae
50
21
Poo-kiew
276
KORNKEN
98
Mookdahan
53
KALASIN
Yangtalad
Kamalasai
Kuchinarai
19
Kosumpisai
38
MAHASARAKARM
74
Banpai
16
Bora-Ra-Bue
Roi-ED
90
33
Saylapoom
17
Wapee patoom
19
Kemaraj
30
Amnas-jareaun
60
Yasotorn
76
CHAIYAPOOM
70
Phol
90
Bua-Yai
11
Kaseswisai
10
Phutthaisong
13
Suvanapoom
18
Jaturas
8
Ta-toom
Ratanaburi
Rasisalai
12
SISAKET
35
435
UBOL
50
Phibulmangsaharn
Warinchamrab
85
10
Noonthai
15
20
Pimai


1,350
NAKORNRACHASIMA
46
Sikew
34
Soong-Nern
29
Pak thongchai
15
Nangrong
Lamplaimas
105
BURIRUM
20
Prakonchai
220
SURIN
38
Srikharaphum
Uthoomphonphisui
Kantrarom
20
Ku-kan
14
Kantaraluk

All Figures Show Maximum KW. in Each Station

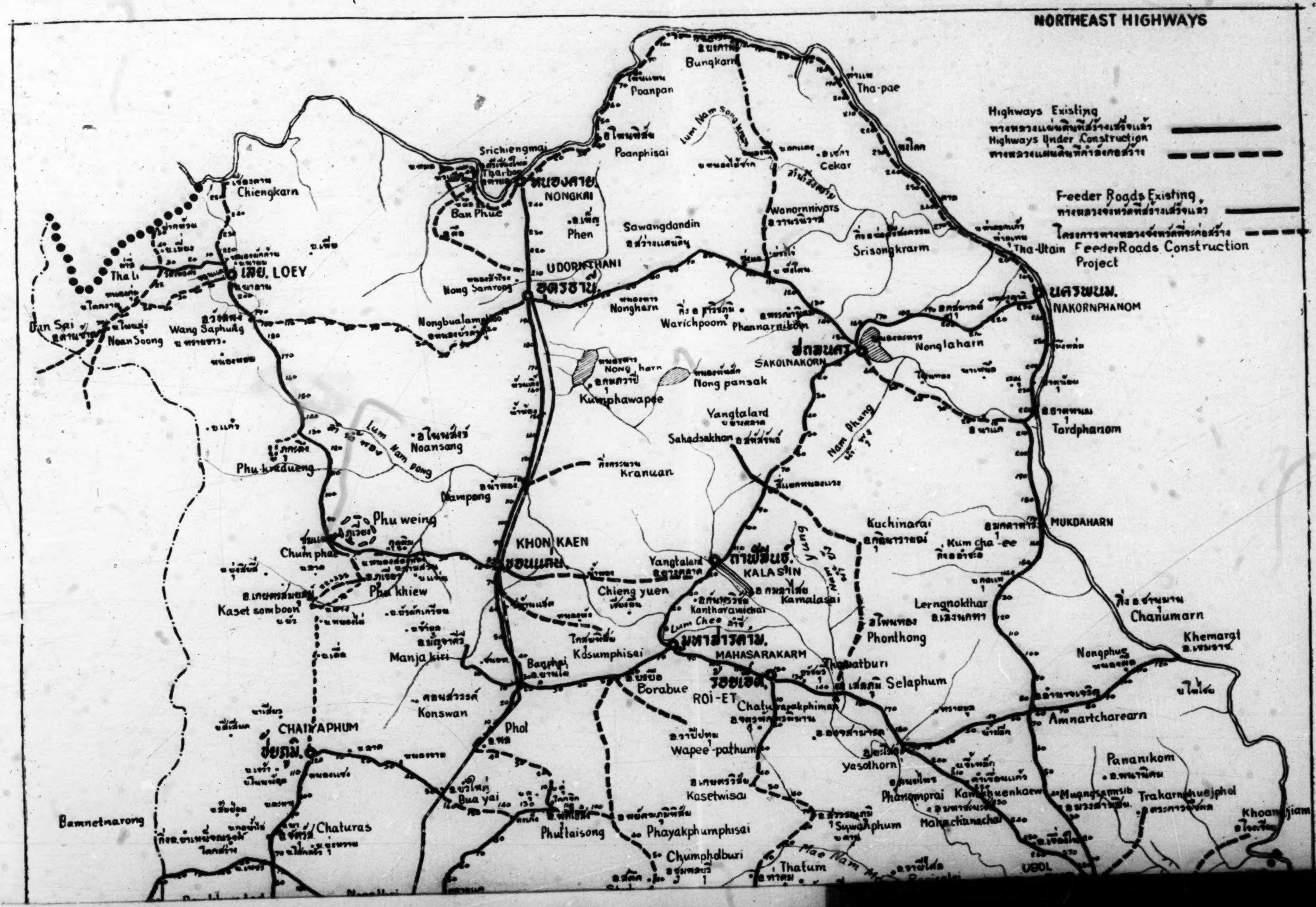
**Note :** Morethan 500 KW. in Udorn and Nakornrajsima

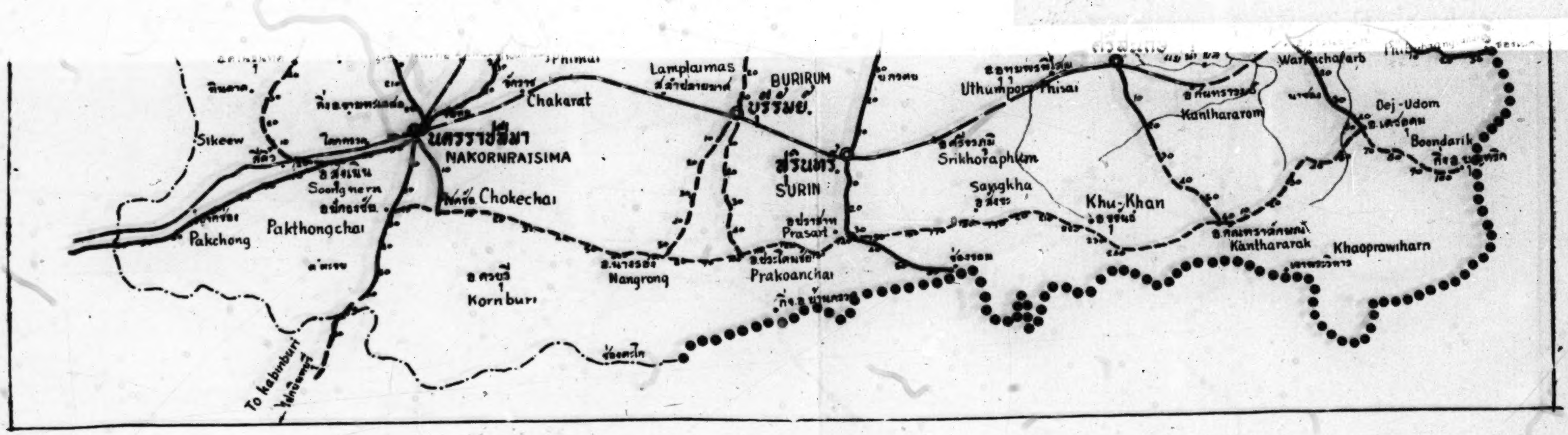
● Less than 50 KW.

● Between 50–100 KW.

● Between 100–500 KW.

● Between 50–100 KW.


NORTHEAST HIGHWAYS
Highways Existing
ทางหลวงแผ่นดินที่สร้างเสร็จแล้ว
Highways Under Construction
ทางหลวงแผ่นดินที่กำลังก่อสร้าง
Feeder Roads Existing
ทางหลวงจังหวัดที่สร้างเสร็จแล้ว
โครงการทางหลวงจังหวัดที่จะก่อสร้าง
Feeder Roads Construction Project
Bungkarn
Tha-pae
Poanpan
Lum Nam Song Kram
Poanphisai
Cekar
Srichiengmai
Tha-bo
หนองคาย
NONGKAI
Chiengkarn
Ban Phue
Phen
Sawangdandin
Wanornnivars
Srisongkrarm
Tha-Utain
เลย LOEY
Tha Li
UDORNTHANI
อุดรธานี
Nong Samrong
Nongbualamphu
Nonghan
Warichpoom
Phannanikom
สกลนคร
SAKOLNAKORN
นครพนม
NAKORNPHANOM
Nonglaharn
Dan Sai
Naan Soong
Wang Saphung
Nong harn
Kumphawapee
Nong pansak
Yangtalard
Sahadsakhan
Nam Phung
Tardphanom
Lum Nam Pong
Noansang
Phu-kradueng
Kranuan
Dampong
Phu weing
Chum phae
KHON KAEN
Kuchinarai
Kum cha-ee
MUKDAHARN
Yangtalard
กาฬสินธุ์
KALASIN
Phu khiew
Kaset somboon
Chieng yuen
Kantharawichai
Kamalasai
Lum Chee
Lerngnokthar
Chanumarn
มหาสารคาม
MAHASARAKARM
Phonthong
Khemarat
Manja kiri
Kosumphisai
Banphai
Borabue
ร้อยเอ็ด
ROI-ET
Thawatburi
Selaphum
Nongphue
Chaturaphakphiman
Amnartcharearn
Konswan
CHAIYAPHUM
ชัยภูมิ
Phol
Wapee-pathum
Yasothorn
Pananikom
Bua yai
Kasetwisai
Phanomprai
Kamkhuenkaew
Muangsamsib
Trakarnphuephol
Bamnetnarong
Chaturas
Phutaisong
Phayakphumphisai
Suwannaphum
Mahachanachai
Khoangjiam
Chumphalburi
Thatum
Mae Nam Mun
UBOL


Phimai
Lamplaimas
BURIRUM
บุรีรัมย์
Chakarat
Sikeew
นครราชสีมา
NAKORNRAISIMA
Soongnern
Chokechai
Pakchong
Pakthongchai
Kornburi
Nangrong
Prakoanchai
SURIN
สุรินทร์
Prasart
Uthumporn Phisai
Srikhoraphum
Sangkha
Khu-Khan
Kanthararom
Warinchamrab
Dej-Udom
Boondarik
Kanthararak
Khaoprawiharn
To kabinburi